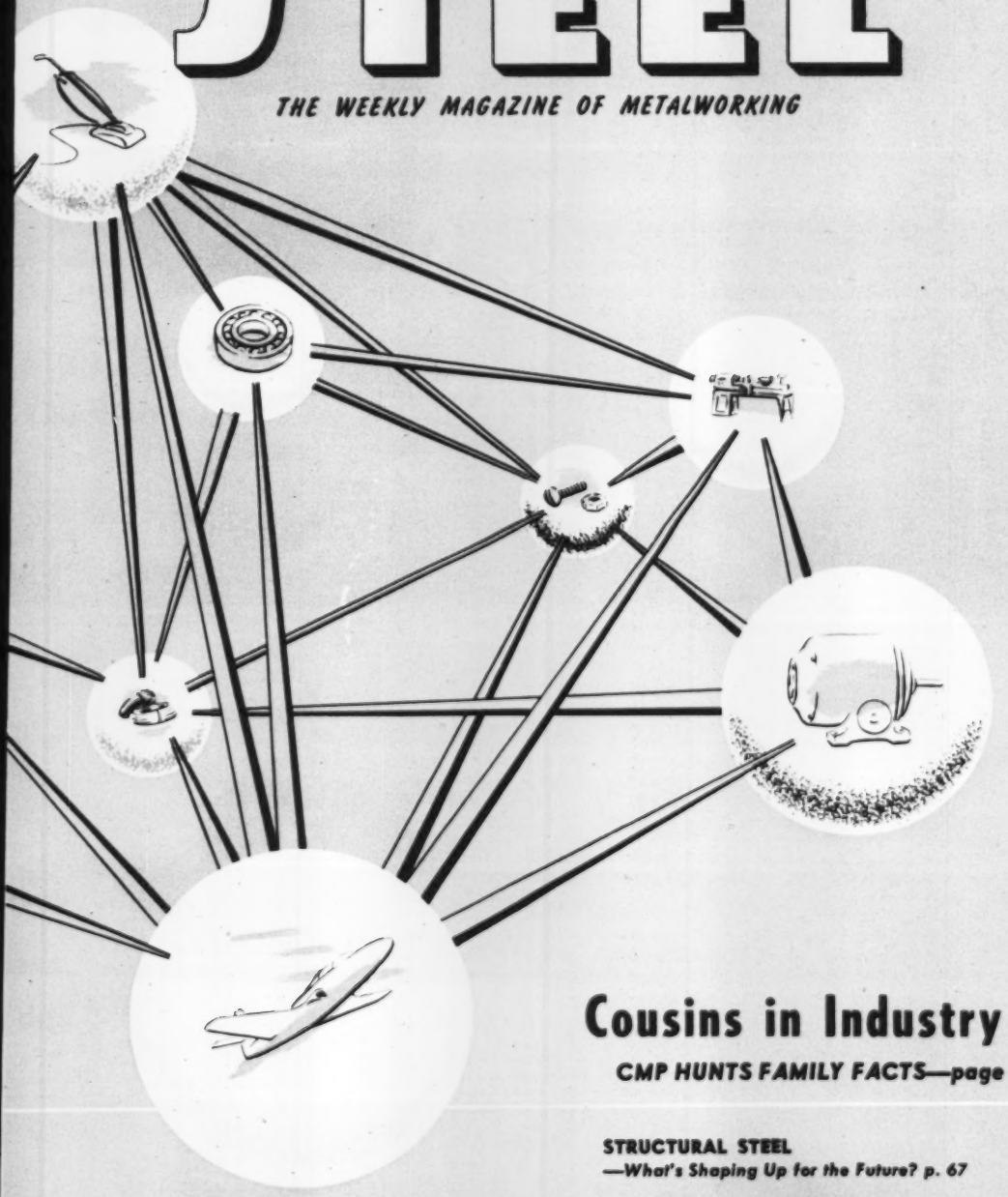
FEBRUARY 18, 1952

STEEL

THE WEEKLY MAGAZINE OF METALWORKING



Cousins in Industry

CMP HUNTS FAMILY FACTS—page 76

STRUCTURAL STEEL
—What's Shaping Up for the Future? p. 67

TOOLING CAN BE CHEAPER
—Solution: Standard Components, p. 98

ELECTRONIC HAMMER
—Bombardment Changes Metal Properties, p. 100

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Engineered to **Prevent** Excessive Tube Stretching and Ballooning!

One of two 600-hp motors used on Foren mill rolling hot-finished tubing from pierced billets.

IN CLOSE-COUPLED TUBE MILLS, off-gauge production due to stretching and lost production due to ballooning can be prevented only by obtaining full speed coordination between stands.

One of the essentials for such speed coordination is low impact speed drop. The 600-hp, 690/1580-rpm direct-current motor shown above gains this objective by a combination of mechanical and electrical design features.

Mechanically, the motor itself is of high inertia design, with a very high peripheral speed. In addition, it is provided with a separate flywheel for added stability.

Further assurance of low impact speed drop results from electrical characteristics made to give low resistance and low inductance. This tends to reduce the transient change in speed when load is applied.

Used on Foren Tube Mill

Two of these 600-hp motors were installed by *Globe Steel Tubes Company* of Milwaukee when they revamped their Foren Mill in 1951.

When the mill was placed in operation 20 years ago, it was one of the first of its kind in the world and had three times the speed of older mills. This high speed was the result of close coordination in mill, motor and control design — with Allis-Chalmers being called in to engineer and supply both the original motors and the control.

Now, using fewer stands and larger motors, the revamped mill is powered by 11 Allis-Chalmers motors totalling 2453 hp, plus a 200-hp bar extractor drive.

CHECK YOUR NEEDS

For more information about custom-engineered large dc motors, including an explanation of the Frog-Leg *winding, ask your nearby A-C representative for Bulletin 05B6002A. Or write to Allis-Chalmers, Milwaukee 1, Wisconsin.*

A 3594

Frog Leg is an Allis-Chalmers trademark.

ALLIS-CHALMERS

Tool Steel Topics

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Fresh-roasted Chisels Halt Costly Breakage

A foundry in the Middle West had long depended on a rule-of-thumb heat-treater to harden the large number of chisels they used daily. One day he quit abruptly. No great concern was felt about his departure—until they began to break as many as 300 chisels in one day.

A trouble-shooter, hurriedly summoned, soon traced the appalling breakage to the as-quenched brittleness of the chisels. The departed heat-treater hadn't revealed how he relieved this condition.

The trouble-shooter went on to explain that the chisels had to be tempered after hardening. But there was no suitable heat-treating equipment in the foundry. Suddenly he hit on the answer. "Tell you what—you can get one of those electric turkey roasters. They cost only about twenty-five bucks and they'll give you a tempering range of about 250 to 500 F. Just what you need."

The division foreman was dubious. How could roasting the chisels do any good? But he bought a roaster and put it on the job. To his surprise it cured the breakage. In the first week they averaged only one broken chisel a day. The roaster paid for itself in no time.

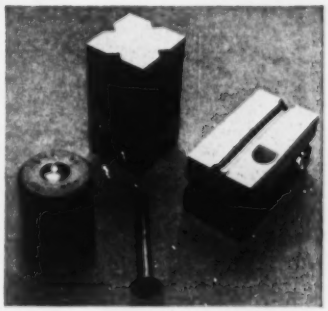
Many tools and dies fail because they haven't been tempered after hardening. Not holding tools at the tempering temperature long enough causes the same sort of trouble. Another important point: always temper tools before they cool down to room temperature. Usually it's best not to let them cool below 150 F.

Cold-heading Die Steel Takes a Real Beating

Maybe you've seen a cold-heading machine in action, forging bolts, rivets, screws, and other products at high speed. The tools and dies which do the cutting, gripping, and heading have to be seen at work to be appreciated. Minute after minute, day after day, they withstand continuous terrific pounding.

Good cold-heading die steel—used for the solid, open, and header types of dies—must have a hard, long-wearing surface, reinforced by a tough core. The hard, wear-resisting case must be deep enough to prevent sinking or upsetting and tough enough to absorb heavy pounding without chipping or spalling.

Cold-heading die steel is one of our special-purpose tool steels. It took quite a few years to work out the right carbon content, depth of hardness, and grain size. For example, we've found that a shallow-hardening steel is best for header dies up to 2-in. diameter; for larger dies a deep-hardening steel gives longer service. Both are fine-grained tool steels, made ever so carefully to insure the ultimate in cleanliness and freedom from injurious defects.



These gripper and header dies of Bethlehem Cold-Heading Die Steel have the ideal combination of hard surface and tough core for cold-heading thousands of bolts each day.

We call it Bethlehem XX Cold-Heading Die Steel. It's really tops for this kind of punishing service. Like to know more about it? Address your request to our Publications Department, Bethlehem, Pa. Ask for Booklet 261.

Our Tool Steel Engineer Says:

A modified oil-quench gets rid of scale on air-hardening tool steels

Some toolmakers object to air-hardening steels because a thin, adherent scale may form during the air-quench. Avoiding this scale is really easy.

Quench the tool or die in oil until it just loses color . . . 900 to 1000 F . . . then cool it in air to about 150 F, followed by the usual tempering operation. The oil-quench will "throw" the scale. But the tool won't crack, because air-hardening steels do not begin to transform, or harden, until they reach 400 F or less.

However, air-hardening steels must *not* be quenched in oil long enough to cool them down below the temperature at which transformation takes place. If this precaution is ignored, cracking of the tool is likely to result.

Air-quenching, of course, results in the minimum amount of distortion.

Bethlehem ULTRASONIC TESTED **Tool Steel**

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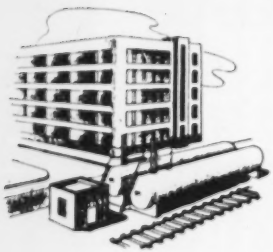
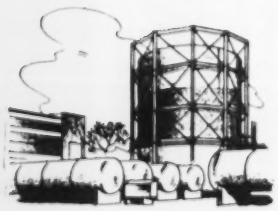


FOR INDUSTRIES

Leading industries use Phillips *66* Philgas successfully for heat treating, mold drying, core baking, ceramic firing and many, many other operations. Automatic Philgas systems assure constant furnace temperatures and atmospheres; constant pressures, high or low.



FOR UTILITIES

Many progressive utilities use Phillips *66* Philgas to augment natural or manufactured gas. High-quality Philgas is uniform in thermal value and gravity, and is free from harmful contaminants. Automatic operation cuts down on overhead.

*Philgas is the Phillips Petroleum Company brand name for its high quality propane-butane LP-Gas or bottled gas.

PHILLIPS PETROLEUM COMPANY

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Offices located in Amarillo, Tex., Atlanta, Ga., Chicago, Ill., Denver, Colo., Des Moines, Ia., Pontiac, Mich., Indianapolis, Ind., Kansas City, Mo., Milwaukee, Wis., Minneapolis, Minn., New York, N. Y., Omaha, Nebr., Raleigh, N. C., St. Louis, Mo., Tulsa, Okla., Wichita, Kan.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

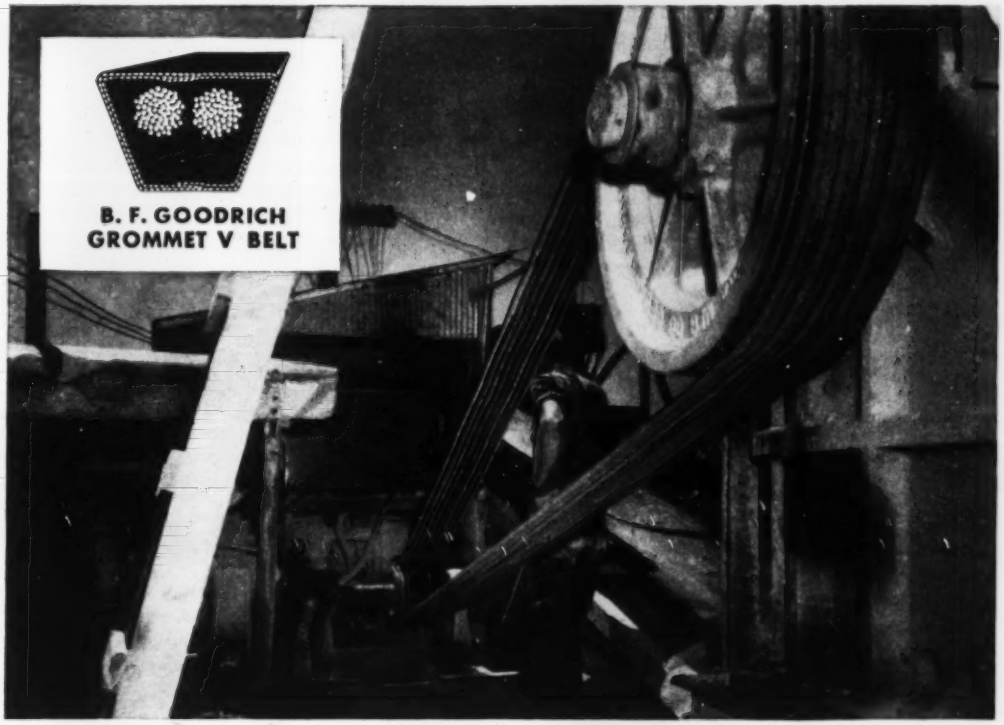

Photo courtesy of Valley Limestone & Gravel, Inc., Farmington, Iowa

Production increased 25 per cent with B. F. Goodrich grommet V belts

B. F. Goodrich often cuts belt costs 20 to 50 per cent

THESE belts drive a rock crusher 9 hours a day, six days a week. In addition to the long hours belts are exposed to dampness, oil and sharp grit. Still worse, the crusher abuses the drive with every impact of its jolting, grinding action. Previously, the operators had "tried everything" including flat belts, other V belts, even a chain drive. But mechanical trouble and production hold-ups continued.

The B. F. Goodrich grommet belts were tried at the suggestion of a BFG distributor's salesman. When the picture above was taken the grommet belts had been in operation almost 2 years. The grommet belts' record: production up 25%, large savings in labor and maintenance time, no belt replacement costs, better working conditions for men—less noise, greater safety. BFG grommet belts can be counted on to *save* because of:

No cord ends—A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping ends. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless cord section in a grommet V belt eliminates such failures.

Concentrated cord strength—All of the cord material in a B. F. Goodrich grommet multiple-V belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. No layers of cords to rub against one other and generate heat; cord and adhesion failures are reduced.

Better grip, less slip—Because a grommet is endless, a grommet V belt is more flexible, grips the pulleys better. Size for size, grommet multiple-V belts will give ⅓ more gripping power, pull heavier loads with a higher safety factor.

Only B. F. Goodrich has the grommet!—No other multiple-V belt is a grommet V belt (U.S. Patent No. 2,233,294). Now available in C, D and E sections. See your local B. F. Goodrich distributor. *The B. F. Goodrich Company, Industrial & General Products Division, Akron, Ohio.*

Grommet V Belts BY
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For Better Hydraulic Brake Cylinders

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STEEL
The Weekly Magazine of Metalworking

VOL. 130 NO. 7 FEBRUARY 18, 1952

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Next Week **... Toned Down Noise Tunes Up Operations ... Machinery Changes Revitalize Sheet Metal Plant ... One Setup Milling Slices Machining Time on Complex Weldments ... Corrosion Resistant Mist**

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IS A PROBLEM
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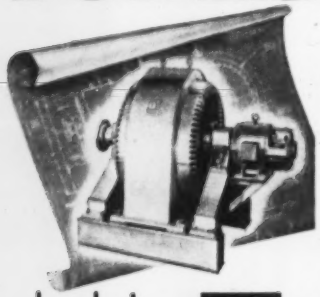

look to... EP

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Behind the Scenes...

Modern Art

American industry is finally carving its niche in the millennium. It's latest achievement by far overshadows all other earth-shaking feats that history will ever record. Industry is influencing modern art, which wiser heads have sworn could be influenced nevermore by realism or naturalism.

The illustration is as the cigarette makers are wont to say "proof positive of this achievement. It shows a new use for steel turnings which "combines the smooth-flowing lines of polished drift-wood with the curv-

ing designs made by a ribbon of steel." Miss Elizabeth Truka, San Francisco art teacher, explains her creation to a perplexed W. S. Briscoe, Bethlehem Pacific Coast Steel Corp. official. The idea came from a tour of Bethlehem Pacific's South San Francisco plant. The turnings (from thread cutting operations in the bolt plant) have taken on various shades of brilliant blue oxide coatings, depending on the heat generated by the thread cutting.

It's a Cow

If you can find last week's issue, with the puzzle picture, turn the page one-quarter revolution in a clockwise direction and you'll see our bovine friend right side up. The photo, we found from John Knox, Steel Plant Editor, came into STEEL's hands through George H. (Doc) Manlove, who died in 1946. The photo was taken in Sweden by a woman early in World War II and enclosed in a letter to her sister in Chicago with the sole inscription: "This is my favorite pet." After a dozen consultations with friends and perhaps psychiatrists, the cow was identified. Some people can spot the animal immediately in the left center of the photo by its black eyes and ears; the black line dividing the face is the fooler. We're rather dull at this sort of thing and still suspect someone's pulling our leg. We'd say it looks more like a photomicrograph of some wild life we studied in school.

Hurry, Hurry

Entire press run of the 1952 Metalworking Yearbook has been spoken for, and the business department informs us that supply is exhausted. We found the editors guarding their personal copies from filching by over-eager Readers' Service people trying to fill orders. Three special features of the yearbook—Metalworking Destiny, Who's Who in Defense and 1952 Metalworking Facts and Figures—are still available in limited quantities as separate reprints. They can be obtained from Readers' Service Dept., STEEL, Penton Bldg., Cleveland 13.

Rationing for Rats

The Department of Agriculture informs us that cheese import quotas have been established through June 30, 1952, as per the Defense Production Act. We can't see much causal connection between the two, but being patriotic souls, aren't raising a fuss over trivial issues. We were pleased to learn where all the cheese is coming from though.

Swiss cheese, you'll be delighted to learn, comes principally from Switzerland; Italian cheese from Italy. New Zealand and Canada dominate the natural cheddar market. Denmark supplies us blue mold; Holland, edam and gouda. Italy will sell us over 13 million pounds of cheese in the 11 months ended June 30—about twice as much as any other country.

Puzzle Corner

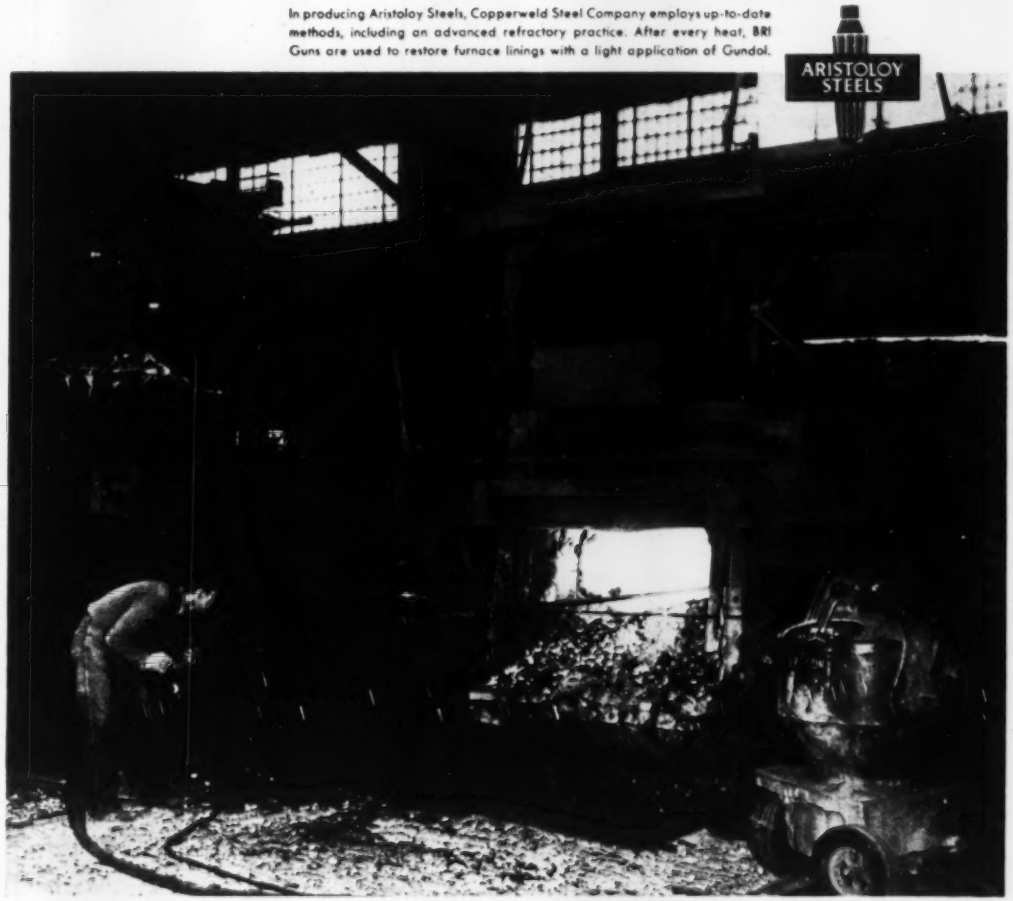
We're inclined to agree with your comments on that wretched Feb. 4 problem. Actually it was more of an exercise in logic than in mathematics. We'll make it up to you with an easy one this week:

A hunter with a gun 1.7 yards long is told that he may not ship it in a baggage car because of a ruling that forbids shipping any article whose greatest dimension exceeds 1 yard. The gun can't be disassembled. What can the hunter do to ship the gun?

Shrdlu

(Metalworking Outlook—Page 57)

In producing Aristoloy Steels, Copperweld Steel Company employs up-to-date methods, including an advanced refractory practice. After every heat, BRI Guns are used to restore furnace linings with a light application of Gundol.



BRI Guns + Gundol = 550 heats per lining at Copperweld

THE record is convincing. In 1951, Copperweld's seven electric furnaces at Warren, Ohio, tapped over 13,000 heats, averaging above 40 tons. Two furnaces set new lining life records—each averaging better than 550 heats. Shop average was 397.5 heats.

In addition to this increase in over-all lining life, operations at Copperweld cite two further benefits from the use of BRI Guns and Gundol: Balanced lining life, with brick patching during campaigns practically eliminated, and maximum furnace availability. To meet critical mill schedules, furnaces have been held two or three days beyond normal relines.

Copperweld Steel Company is one of many electric steel producers now using BRI Gun refractories. If you operate electric furnaces, large or small, you, too, will be interested in the economies possible with the BRI Gun and Gundol or Gunmix.

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"How we may help you get the metal you need".

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"Monel sheet was required for a chemical unit. The customer assumed that Monel was not available though it was the metal that would do the job most satisfactorily.

"We, his warehouse, were able to advise him that a CMP rating could be secured for this particular application and the Monel could be had if he would take an extended mill delivery.

"Or, if he could give us a choice of alternate sizes and gauges, it might be available from our warehouse emergency stocks.

"He secured a rating, placed his order and in this case we were able to deliver the Monel sheet in time to meet his requirements."

• • •

And just what kind of help can these Warehouses give you? First, they are suppliers of metals . . . not only Inco Nickel Alloys but other metals as well. They know the availabilities and times needed for delivery.

These Warehouses maintain complete up-to-date information on Government orders and regulations — information that may save you time and trouble in getting the metals you need.

If you have a corrosion problem or require technical assistance on the fabrication or mechanical application of a metal or alloy, they will gladly help you. If they don't already have the necessary information they will get it from the engineering or research staffs at Inco.

WHAT *You* CAN DO:

1. Consult your Warehouse on availability of metals and alloys.

2. Order well in advance of your requirements. Deliveries take longer today.

3. Make certain that your orders carry the D.O. or C.M.P. ratings and in case of Dept. of Defense orders, include contract number.

4. Be sure also to give full and specific "end use" information as evidence of need for N.P.A. approval.

5. Indicate alternate choices on sizes and materials . . . where possible. By so doing a satisfactory alternate often may be obtained more promptly.

6. Depend upon your Warehouse for as much service as possible. Use its existing facilities to eliminate operations in your plant or ask for names of experienced fabricators who can help you.

7. Don't hesitate to ask technical questions about selection, uses and working of Nickel, Monel, Inconel and other critical metals. Often, suggestions can be offered which reduce shop spoilage . . . and save metal.

Very often your Metal Warehouse can help you overcome production difficulties with its on-the-spot knowledge of metals and availabilities. And frequently they can suggest substitute sizes, or in some cases name alternate materials.

All the companies listed here supply Inco Nickel Alloys. Just write to the one nearest you — or better still, pick up the phone and tell them your troubles.

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TOLEDO 2—Williams and Company, Inc.
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TORONTO 5, ONT.—Alloy Metal Sales, Limited
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3. Self-adjusting chevron type packing.
4. Permanent type adaptor ring.
5. Hi-tensile tie rods.
6. Heavy duty, hard chrome plated rod.
7. Generous fillet reduces stress concentration.
8. "O" ring static seal.
9. T-J new flexible cushion seal insures positive cushion with automatic valve action for fast return stroke. (Patent applied for)
10. Fine cushion adjustment.
11. Heavy wall precision honed hard chrome plate.
12. Controlled packing compression with metal to metal contact.

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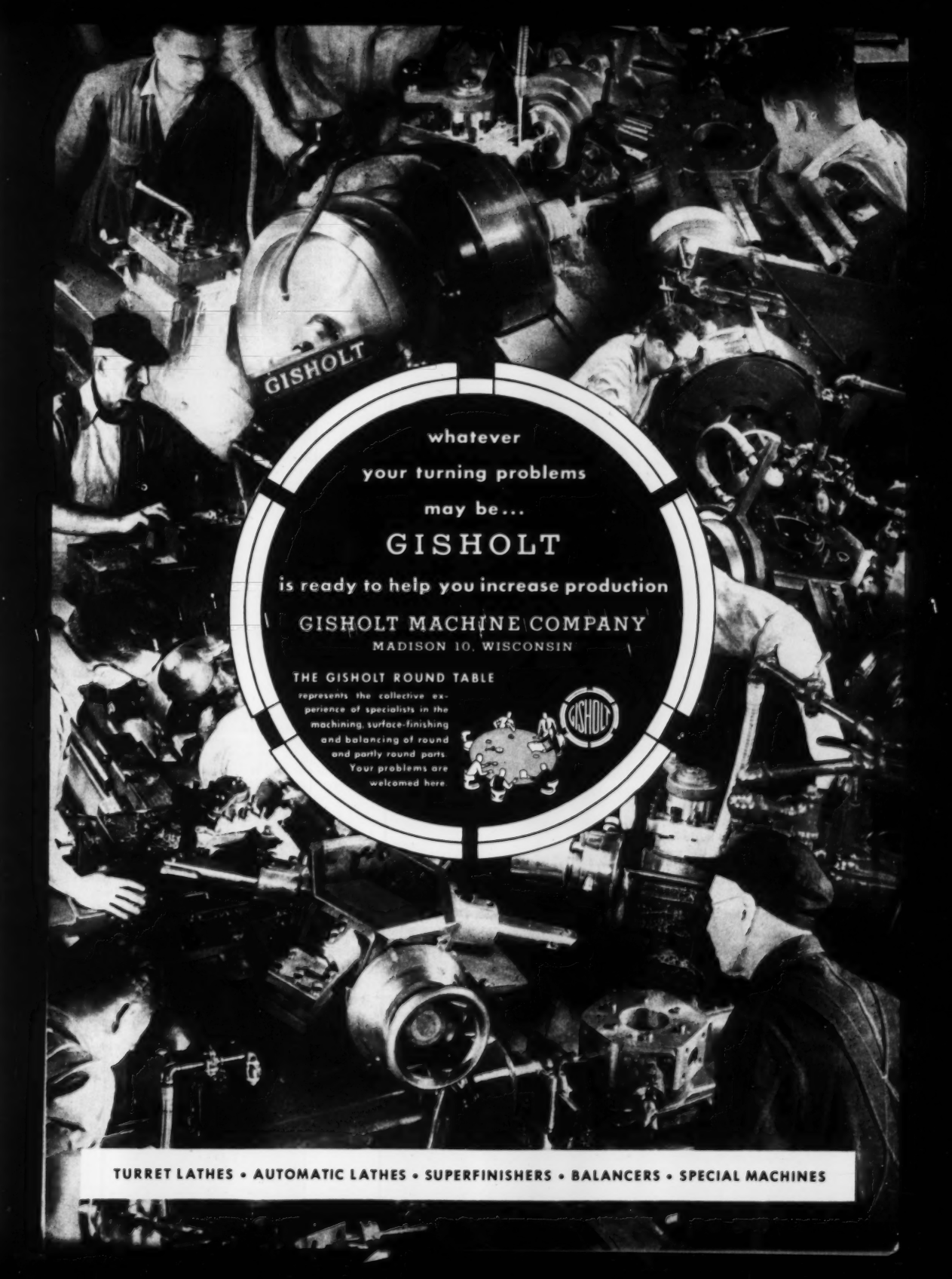
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is ready to help you increase production
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represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.
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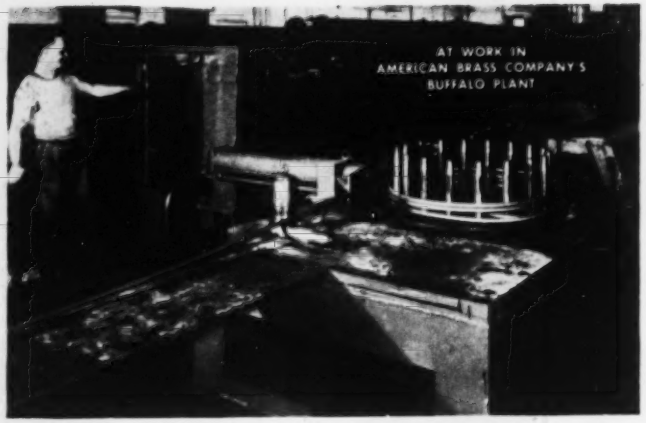

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- *Adjustable, ELECTRONIC control of speed and tension!*
- *Works on standard alternating current!*
- *Speeds from 50 to 400 linear feet per minute!*

If you face the problem of coiling extruded non-ferrous bars of any composition up to 7½" wide and ½" thick, this revolutionary Torrington machine has the features you need:

1. Adjustable automatic *electronic* control of speed and tension, to synchronize with the speed of the bar as it is extruded.
2. Variable speed from standard AC power supply—no expensive DC installation needed.
3. Air-operated ejector pushes finished coil off machine.
4. All parts above table top are arranged for easy removal to provide unobstructed flat working surface or allow extruding straight lengths without interference. Air-powered pins of pin-type coiling reel retract flush to table top.
5. Built to the precision standards for which Torrington machines have been famous for 65 years.

Torrington's decades of experience and knowledge, gained from continuous collaboration with foremost makers and fabricators of metal, are at your service to help you put this revolutionary new Bar Coiler — or any other Torrington special-purpose machine — to profitable use in your plant.

Call or write Torrington for information and name of nearest Torrington representative.

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MANUFACTURING COMPANY • TORRINGTON, CONNECTICUT

DESIGNERS AND BUILDERS OF MILL MACHINERY FOR SIXTY-FIVE YEARS

LETTERS
TO THE EDITORS

Echoing STEEL in Industry

To conserve vital alloying elements, the Ordnance Corps is vitally interested in the development of boron treated steels. We would like permission to reproduce your article "Boron Steels" (Jan. 14, p. 66) for distribution within the Ordnance Corps.

R. W. White
assistant, chief of ordnance
Department of the Army
Washington

May we reprint part of the article "Insuring Dimensional Accuracy Through Heat Treatment" (Feb. 18, p. 90)?

Gerrit De Vries
U. S. Naval Ordnance Test Station
Pasadena, Calif.

In connection with a revision of the "Atlas of Isothermal Transformation Diagrams," may we use diagram No. 5 from your article "Heat Treatment of Heavy Cast Steel Sections" (Nov. 18, 1946, p. 88)?

E. S. Davenport
U. S. Steel Co.
Pittsburgh

May we have permission to reproduce the STEEL cover of Oct. 22, 1951?

Joseph Hudson
Designers for Industry Inc.
Cleveland

We would like permission to reproduce the article "Extrusion plus Forging" (Jan. 14, p. 54) for distribution to each of our members.

John R. Herrickson
Formed Steel Tube Institute
Cleveland

• *Permission granted*

Article Fills a Need

I would like to congratulate you on your article, "Phosphatizing," (Jan. 28, 1952, p. 64). Articles of this nature will be quite helpful to fabricators who are now using phosphate coating for the first time.

Norman P. Gentieu
American Chemical Paint Co.
Ambler, Pa.

P. S. Please send me an extra copy for our files.

Who and Where Department

I was told you published an article on the use of nitrogen and lime to reduce the sulphur content of open hearth steel. Will you tell me in what issue the article appeared?

John W. Caldwell
industrial engineer
Standard Steel Works Div.
Baldwin-Lima-Hamilton Corp.
Burnham, Pa.

• *The article you desire appeared Oct. 8, 1951, p. 138, under the title "Calcium Cyanamid—A Source of Nitrogen in Steel."*

MINUTES VS. HOURS

OF HYDRAULIC PIERCING OF DRILLING AND MILLING

This special purpose Danly Hydraulic Piercing Machine pierces nearly 100 accurately indexed slots in a high alloy jet engine shroud ring in less than 5 minutes. Many hours of costly drilling and milling would be required to complete the same operation with equal accuracy by ordinary methods.

DANLY HYDRAULIC METALWORKING EQUIPMENT

Machines like this illustrate the truly amazing production time and cost savings that Danly's new line of Hydraulic Metalworking Equipment can achieve in a wide variety of operations . . . piercing, bending, trimming, extruding or riveting—under mass production or job shop conditions. Exclusive hydraulic circuit and power cylinder design features permit faster, smoother operation at higher pressures.

Call a Danly engineer today to see how Danly Hydraulic Metalworking Equipment will increase your output.

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DANLY MACHINE SPECIALTIES, INC.

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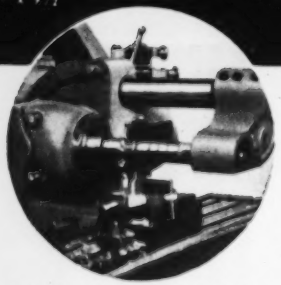
hydraulic metalworking equipment . . . *Standard or Special*

Van Norman No. 16

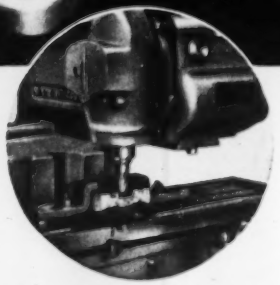
Gives You the Workability of Three Machines

MODEL NO. 16
Cutterhead in Vertical Position
Table Size
37" x 9½"

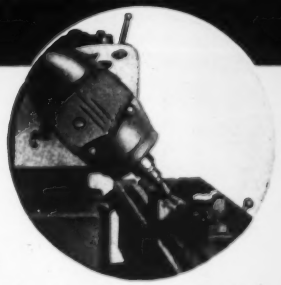
HORIZONTAL VERTICAL ANGULAR



With the cutterhead locked in horizontal position, the No. 16 is used for horizontal milling operation. Hardened stop set at factory assures positive 0° setting.



Illustrated, the No. 16 is used for a vertical milling operation. Permanently fixed hardened stop permits easy, accurate positioning of the cutterhead at 90°.



Here the adjustable cutterhead is set at 45° angular milling position. Horizontal, vertical, or angular milling all are easily performed on the No. 16 Miller.

Ram Type Miller

Here's a miller so versatile that it enables you to perform any and every milling job from horizontal to vertical . . . simply by positioning the adjustable cutterhead which is mounted on a movable ram. Why do you benefit . . . because with this one machine you have the work range of several single purpose millers. This enables you to keep the Van Norman miller working all the time . . . also many jobs can be carried through to completion without changes in the workpiece setup — saving time and reducing errors.

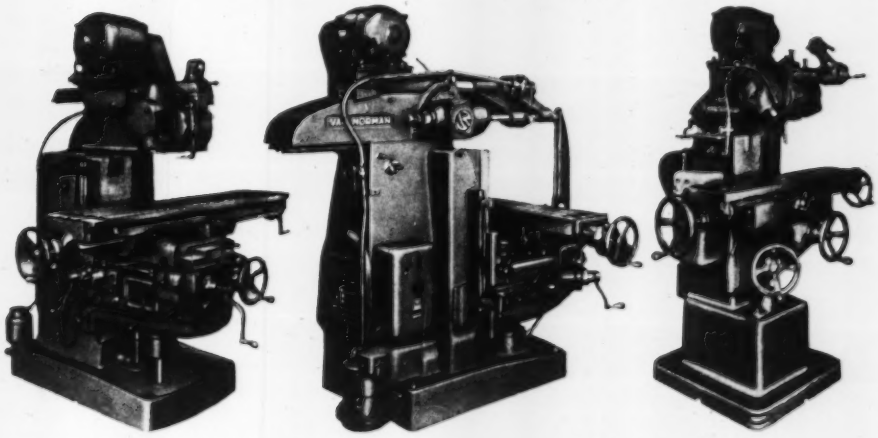
The Van Norman No. 16 Ram Type Miller gives you these additional advantages —

Conveniently grouped controls in front of knee makes operations easy. Power feeds are selected with a quick change feed selector. Large, easy-to-read dials.

Built-in electric controls simplify operation. Single lever selector controls spindle, feed and coolant. Push-button, on front of knee, starts and stops motors as pre-selected.

Rugged base and column, massive cutterhead, large ram and heavy knee, saddle and table assembly provide maximum rigidity and long life accuracy.

OTHER VAN NORMAN RAM TYPE MILLERS THAT REDUCE PRODUCTION COSTS



MODEL NO. 38
Cutterhead in Vertical Position
Table Size: 64" x 14"

MODEL NO. 22L
Cutterhead in Horizontal Position
Table Size: 45" x 10"

MODEL NO. 12
Cutterhead in Angular Position
Table Size: 37½" x 9 3/16"

VAN NORMAN COMPANY
SPRINGFIELD 7, MASSACHUSETTS

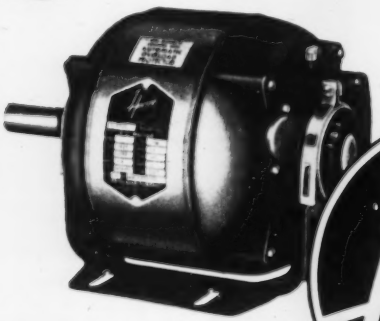
A quiet worker

Hoover Motors go about their business quietly.

They *start* quietly even on heavy-duty jobs—with starting torque that spins hard-to-get-going machinery into action without strain or vibration. They *run* quietly because they run smoothly—with running torque that maintains even speeds from start to full rated load and beyond.

High precision is woven into every mile of wiring—fitted into every working part. No lag or drag. So, Hoover Motors are low-cost workers, too. They make the most of each "watt" of electricity—pay dividends in longer life.

And service? *When* it's needed, *where* it's needed. Hoover's service facilities are world-wide—always ready to protect your customers and to guard your good name.



Among Hoover's *general-purpose* motors, there are models that give you a widely varied choice of *Capacitor-Start, Split-Phase* and *Poly-Phase Motors*.

In *special-purpose* motors, too, there probably are Hoovers that will meet your specifications "as is"—including models for pumps, oil burners, fans and blowers.

Ask your distributor for full information, or write us direct.

Hoover® electric motors

since 1934

THE HOOVER COMPANY

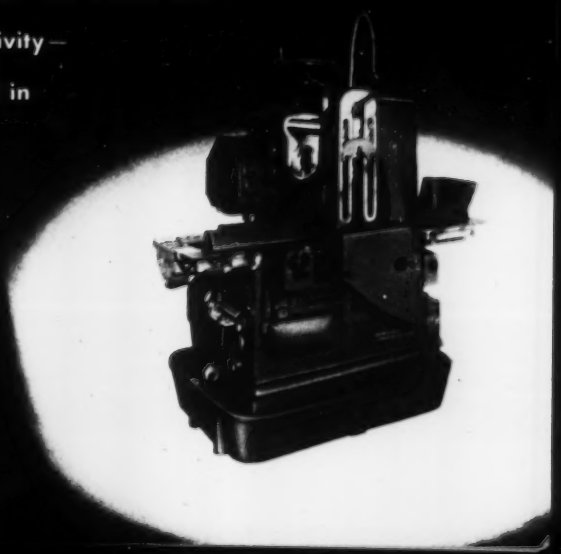
Kingston-Conley Division

22 Brook Avenue North Plainfield, New Jersey

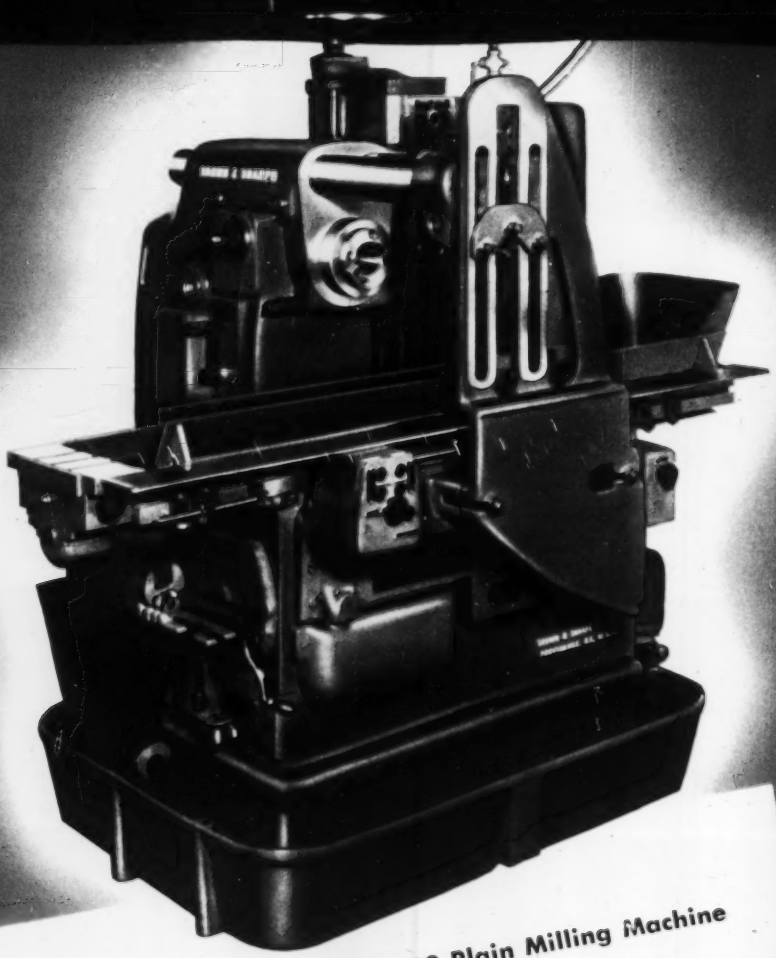
Productioneered

Equipment for Long- or Short-Run Milling

Quick and easy to set up, with convenient controls, Brown & Sharpe manufacturing type milling machines are specifically designed for production milling of a wide variety of parts with uniformly high precision and minimum lost time. This means that they are engineered for higher productivity — "Productioneered" to pay off in maximum production for you.



Productioneered for manufacturing medium size parts with high precision, low cost



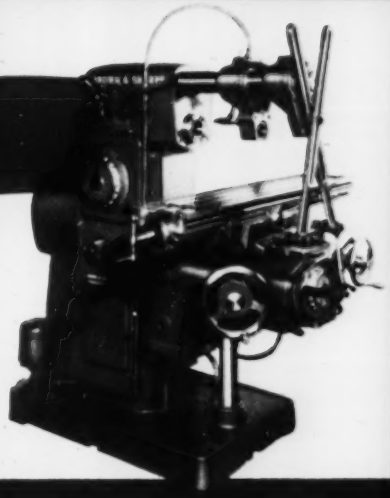
Brown & Sharpe No. 12 Plain Milling Machine
7½ h.p. Spindle Drive

This machine is the answer to the increasing demand for accurately-made small and medium sized parts, produced in any quantity, at low cost.

Complete electrical control of all power movements gives unusually precise, smooth performance with outstanding ease of operation. Wide variety of automatic cycles obtainable, with time-saving dual feed rate. Climb milling in either direction permitted by built-in, automatically-released backlash eliminator.

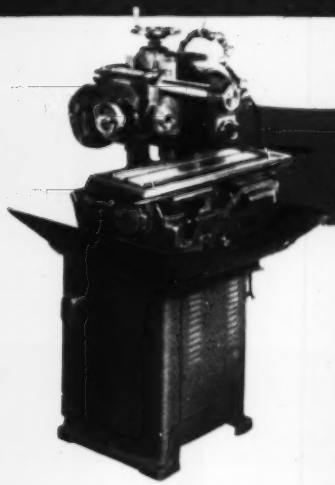
Same features in 3 h.p. Spindle Drive Machine for lighter work.

for greater flexibility



No. 2 Plain Milling Machine, 5 h.p.

Tri-motor drive, column-and-knee type design and extended spindle face give this machine additional set-up and handling flexibility . . . permit exceptional operating efficiency. (Same features in 3 h.p. machine).

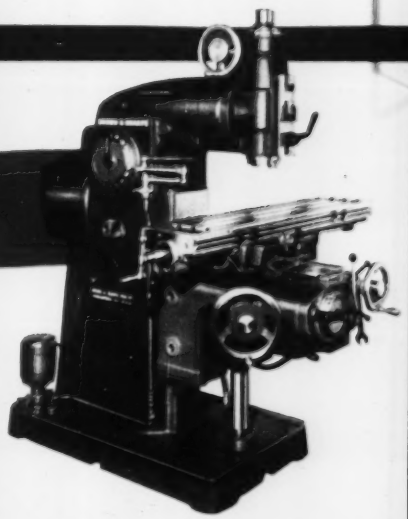


for economical, fast production of small parts

No. 000 Plain Milling Machine

Simple set-up, fast operation, consistent accuracy for production of small parts for firearms, radios, sewing machines, etc. Uniform positive feed assures long cutter life.

for versatile vertical milling

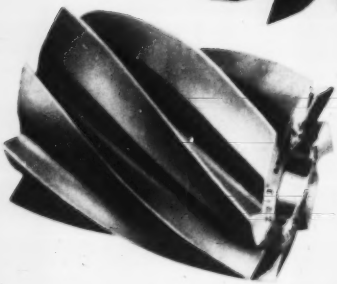


No. 2 Vertical Milling Machine, 5 h.p.

In addition to the usual features of a vertical, this machine incorporates the versatile swiveling head, making it possible to mill or drill at angles, either by hand or power, and without special fixtures. (Same features in 3 h.p. machine.)

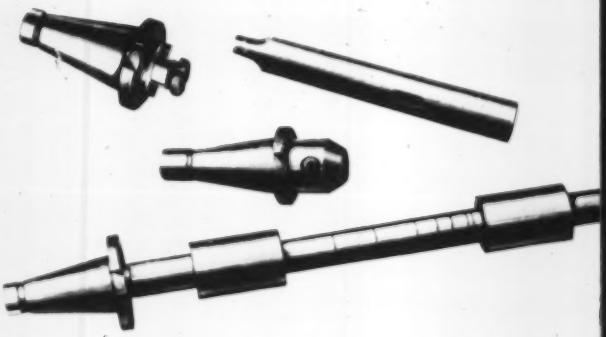
Productioneered

for wide range, time-saving efficiency in operation



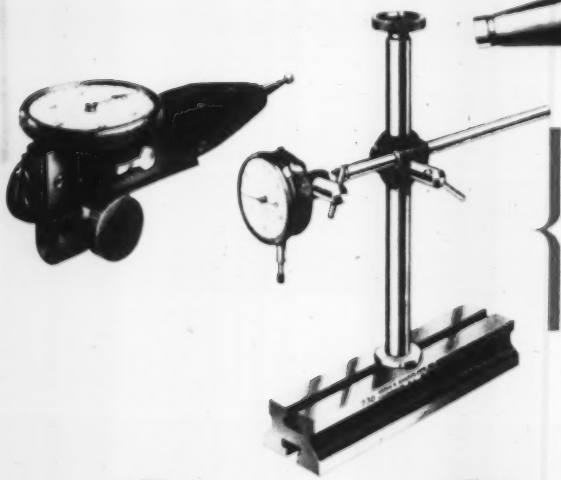
Cutters and End Mills

The closer the cutter is matched to the job, the faster the cut and the less power it takes. Brown & Sharpe offers a complete line for accurate selection of the most efficient tool for each production job.



Arbors, Adapters and Collets

The consistent strength and precise grinding to close tolerances of Brown & Sharpe Arbors, Adapters and Collets insure true milling in even the deepest cuts.



Dial Test Indicators

For on-the-job accuracy checks that maintain high production, these are extremely important instruments. Especially valuable, too, to set-up men, machine erectors, inspectors and toolmakers.

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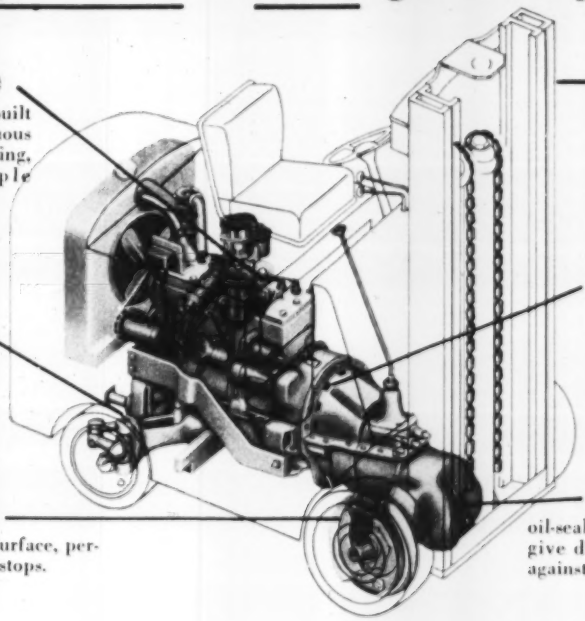

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Exclusive YALE features lick major breakdown causes

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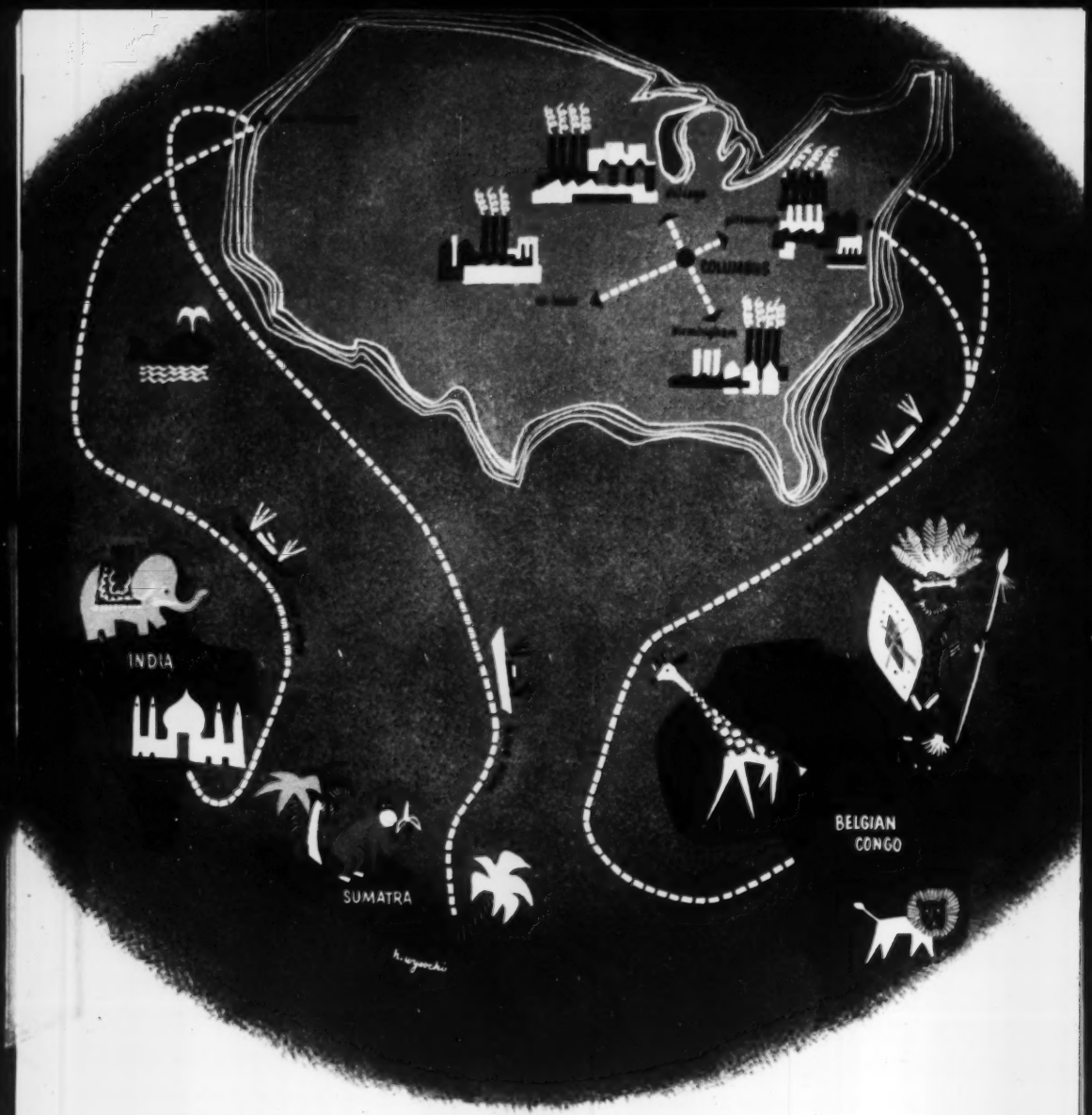


Not half a world away . . . but right in the heart of the industry

The map tells the story. Contrast the complications in obtaining palm oil from foreign-controlled sources with the reassuring ease of getting its new domestic replacement, *Palmoshield*. For the imported product: harvesting, extracting, refining, transporting to port, loading on tanker, shipping 8000 miles or more to U.S., unloading for tank storage, reheating and reloading for shipment to customers. For domestic *Palmoshield* a call to Ironsides in centrally located Columbus brings immediate shipment with delivery in no way dependent on uncertain world conditions.

New All-American Lubricant for Cold Rolling Operations

FROM The Ironsides Company of Columbus, Ohio, comes another important contribution to the American steel industry.

It is Palmoshield, the first workable replacement for imported palm oil . . . a 100% domestic product which frees U. S. tin plate producers from dependence on foreign sources for the essential lubricant in rolling operations.

All-American Palmoshield duplicates every chemical characteristic of the imported oil. It looks like palm oil, feels like palm oil, acts like palm oil, handles like palm oil and requires absolutely no changes in rolling mill operation. It is superior to palm oil in that it is subject to exact chemical control.

Tested for three years in actual rolling mill operation

Palmoshield has been under continuous testing for the past three years in cold rolling steel production under standard operating conditions.

Rolling characteristics are equal to palm oil. The cleaning operation is above average. Annealing and temper rolling are up to standard in every way. Tinning, both hot dip and electrolytic, yields a most satisfactory product. During this testing, the new Ironsides lubricant was reclaimed with good results both as to yield and product.

Tests prove four advantages over imported palm oil

1. *Palmoshield is widely available in this country. Users are not dependent on shipping during unsettled world conditions.*
2. *The domestic materials which go into Palmoshield are so freely available as to supply all steel production of the United States without "borrowing" from other defense requirements.*
3. *Due to its availability, Palmoshield need not be stockpiled. However, there is no deterioration from extended storage.*
4. *Palmoshield is subject to exact chemical control. The free fatty acid content does not vary from batch to batch and can be specified by the user.*

Palmoshield now in commercial production

With testing completed and production on a commercial basis, Palmoshield is now available for immediate shipment to steel companies in 55-gallon drums and in tank car lots. It is competitively priced. For complete details call or write The Ironsides Company, 270 West Mound Street, Columbus, Ohio. Upon request, the Ironsides representative in your area will call and give you full information in person.

Tough lubrication problem? Call on Ironsides first!

Palmoshield is by no means an "out-of-the-blue" discovery. It is a product of years of research prompted by the fact that World War II emphasized a definite threat to American steel producers dependent on overseas sources. More than that, it is backed by Ironsides' sixty years of specializing solely in the field of scientific lubrication.

Many steel men are familiar with other Ironsides "firsts," among them wax base drawing lubricants, aircraft cable lubricants, electro-deposition of drawing lubricants, outboard motor lubricants and stabilized non-ferrous wire drawing lubricants. It's significant that in any field it is the specialist who comes up first with the right answer to the tough problems. If yours is lubrication, consult the specialist—call on Ironsides first.

SPECIAL LUBRICANTS and PRESERVATIVES

IRONSIDES SHIELD PRODUCTS **PALMOSHIELD**

It's easier than you think...

to equip with ball bearings

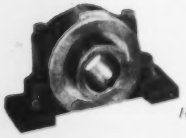
FAFNIR economy packages

Typical Fafnir "packaged" ball-bearing units for textile machinery.

Tape Tension Pulley

Slasher Cylinder Unit

Open Scoper Right End Unit



Bale Breaker Shaft Unit

Apron Adjusting Bracket

Would you like to add the advantages of ball bearings to your machines or equipment? Maybe you've passed them up, feeling that a changeover would involve extra work or parts — machining, special housings, lubricating systems.

With Fafnir Economy Packages, it's easier than you think to equip with ball bearings. These units are complete with housings, seals and shields . . . all ready to slip into place on an amazing variety of machines and equipment. They require no shouldering, threading, lock nuts or adapter devices. Take textile machinery, for example there's a Fafnir Packaged Unit for practically every turning point on over 60 types of machines.

Whether you're in textiles or any other industry, a few minutes spent with a Fafnir engineer may bring forth an Economy Package which gives you all the advantages of ball bearings at minimum cost. The Fafnir Company, New Britain, Conn.

FAFNIR

BALL BEARINGS

MOST COMPLETE LINE IN AMERICA

Case History No. 106

Rolling Mill Screwdown

9/10 LESS Lubricant Used

THE I.P. LUBRICANT

with "indestructible pH-film" capable of withstanding pressures up to 50,000 psi.

With BROOKS

LEADOLENE

On each eight hour shift in a large eastern steel plant 30 gallons of good quality steam cylinder oil were used on each of the two screws of a modern slabbing mill. Then LEADOLENE was thoroughly tested, and the tabulated results showed that only 3 gallons per eight hour shift were used on each screw . . . a savings of 9/10 on lubricant consumption. In addition, operating temperature of the screws was reduced from 210° F to 140° F.

On rolling mill screwdowns, the most difficult of all screws to lubricate, LEADOLENE consistently has reduced lubrication consumption and extended equipment service life. With its "Indestructible pH-ilm," plus high adhesiveness, exceptional temperature characteristics, and low pour point and viscosity, LEADOLENE gives superior service on all types of screws used to move apparatus . . . whether open or enclosed, horizontal, vertical, inclined, high or low speed.

Write for technical data or generous samples for your testing.

With LEADOLENE You Get These Characteristics Essential to Good Screwdown Lubrication

pH-ilm Strength . . . 50,000 psi minimum.

Adhesiveness . . . Affinity for metal develops maximum adhesion and reduces dripping and creeping.

Water Repellence . . . Effectiveness is not reduced by water.

Corrosion Prevention . . . Never acidic and will not etch or corrode.

Compounded Stability . . . Will not bleed or change physical condition within a greater temperature range.

Low Temperature Factors . . . Does not harden, crack or decrease in adhesion.

Abrasive Resistance . . . Repellent to adhesion of scale, metallics and other contamination.

The Brooks Oil Co.

Since 1876

Executive Offices and Plant . . . CLEVELAND, OHIO
Executive Sales Offices . . . PITTSBURGH, PA.
Canadian Offices and Plant . . . HAMILTON, ONTARIO
Cuban Office . . . SANTIAGO de CUBA

"'Specials' are routine... with our *Lectromelt* furnace"

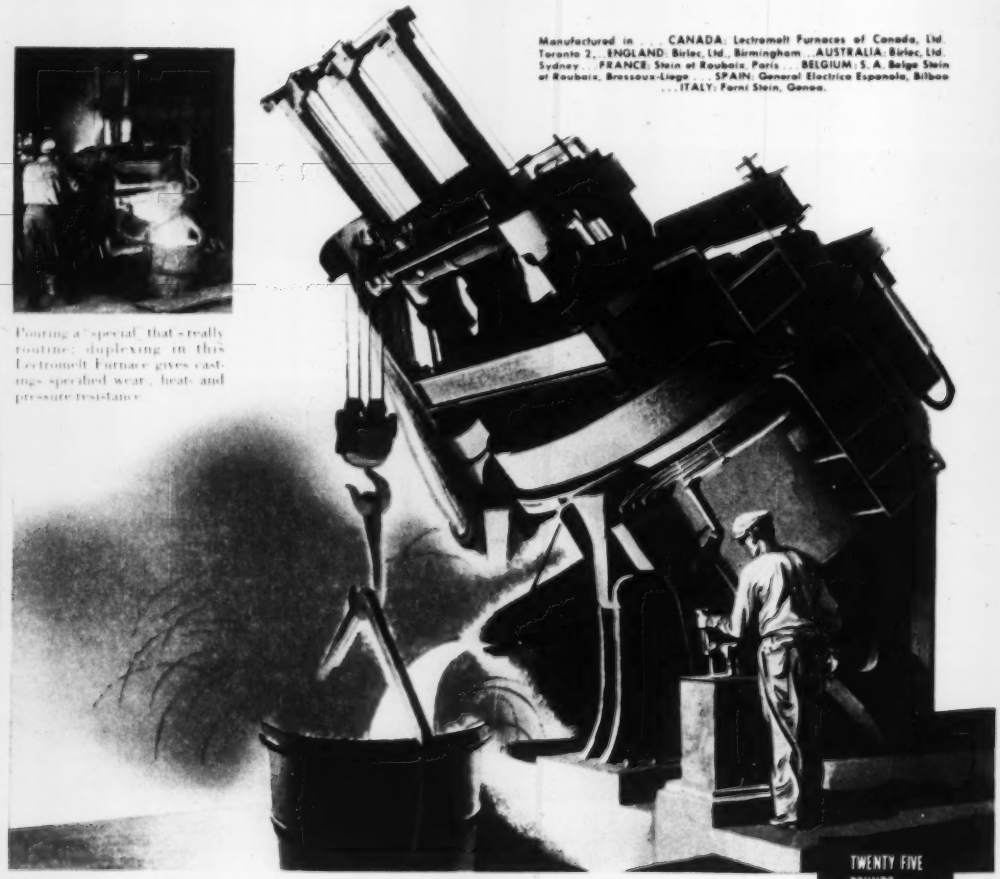
"'Special' irons for 'special' castings are actually routine production in our factory," says one gray iron foundry plant engineer. His chief metallurgist adds, "The electric furnace process is the only way to produce irons that will meet the tensile strength and machinability requirements that our customers need in special castings."

The furnace he mentioned, of course, was a Lectromelt*—and the results he mentioned are typical of the precise control that Lectromelt furnaces make possible, whether you're working with irons, semi-steels or alloy steels. Precise control at costs often comparable to cupola melting—and with unmatched flexibility.

Labor-saving, top-charging Lectromelt Furnaces make possible such precise control at low cost, whether you're melting or smelting, refining or reducing. Our engineers will gladly discuss means of cutting costs for these operations, without cutting quality. Write Pittsburgh Lectromelt Furnace Corporation, 323 32nd Street, Pittsburgh 30, Pa.

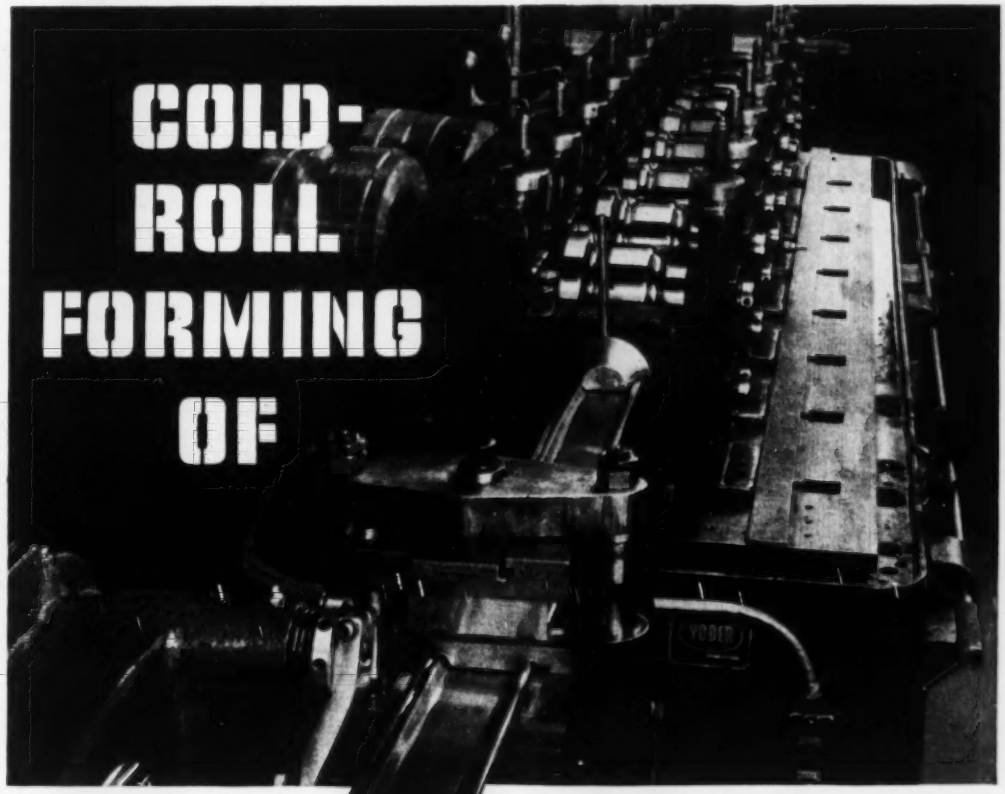
Pouring a "special" that's really routine: duplexing in this Lectromelt Furnace gives castings specified wear-, heat- and pressure-resistance

Manufactured in . . . CANADA: Lectromelt Furnaces of Canada, Ltd. Toronto 2, . . ENGLAND: Birlec, Ltd., Birmingham . . AUSTRALIA: Birlec, Ltd. Sydney . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Brassoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa.



*REG. T. M. U. S. PAT. OFF.

WHEN YOU MELT... MOORE RAPID *Lectromelt*



Pre-Coated Stock

• When roll forming is not to be followed by other operations which may damage fine finishes, it is common practice to use stock which has already been given the finish ultimately desired. Because, with proper design, roll pressures can be held extremely low, and the further fact that the metal is not heated, the process permits a wide freedom of choice in decorative and protective finishes.

Large quantities of hot dipped galvanized stock are being cold-roll formed. Electro galvanizing and plating with chromium, brass and copper most easily meet roll-forming requirements. So also metal which has been polished, burnished, buffed or similarly treated.

Roll-forming of stock which has been painted or given other organic coatings, is also practical. Better coatings are constantly being developed for this purpose.

Thickness of stock, design of profiles, kind of coating desired, and number of roll passes, are the principal factors to be taken into account.

The services of Yoder engineers are at your disposal in finding the best answer to problems of this kind. Yoder Book on Cold-Roll-Forming is yours for the asking.

THE YODER COMPANY • 5502 Walworth Ave., Cleveland 2, Ohio

Complete Production Lines

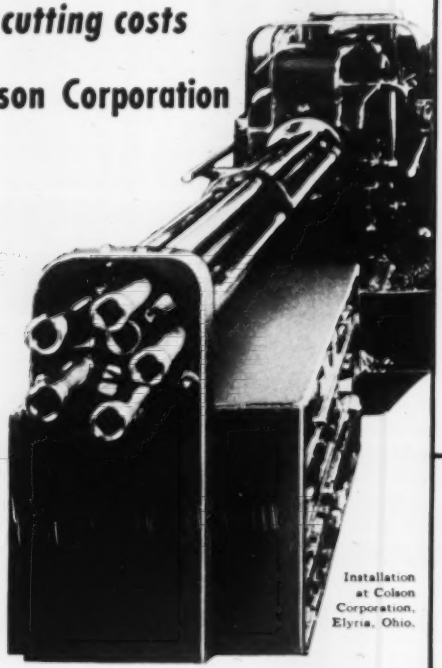
- ★ **COLD-ROLL-FORMING and auxiliary machinery**
- ★ **GANG SLITTING LINES for Coils and Sheets**
- ★ **PIPE and TUBE MILLS–cold forming and welding**

ENGINEERING YODER MANUFACTURING

Warner & Swasey Automatics

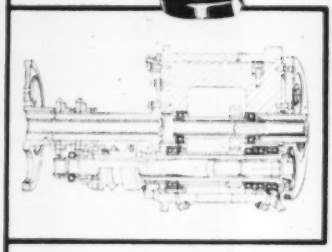
are cutting costs

for Colson Corporation



Installation at Colson Corporation, Elyria, Ohio.

—and their 5-Spindle Automatic Bar Machines are SKF-*equipped*



Here's what Warner & Swasey designers did for one of their customers with advanced 5-spindle automatic bar machines • cut set-up time more than 50% • increased production 7 to 8 times on lots of 500 to 10,000 pieces • made "progressive" set-ups much more practical • made small lots economically practical • provided easy access and interchangeability of tooling • eliminated cam changing.

SKF Double-row Cylindrical Roller Bearings are used on front and rear locations. SKF Ball Thrust Bearings are adjacent to front Bearings. This design gives maximum rigidity through a variety of feeds and speeds without the need of bearing adjustment. Again, the teamwork of machine and bearing designers resulted in advance-designed equipment.

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.— *manufacturers of* **SKF** *and* HESS-BRIGHT *bearings.* 7325

SKF®

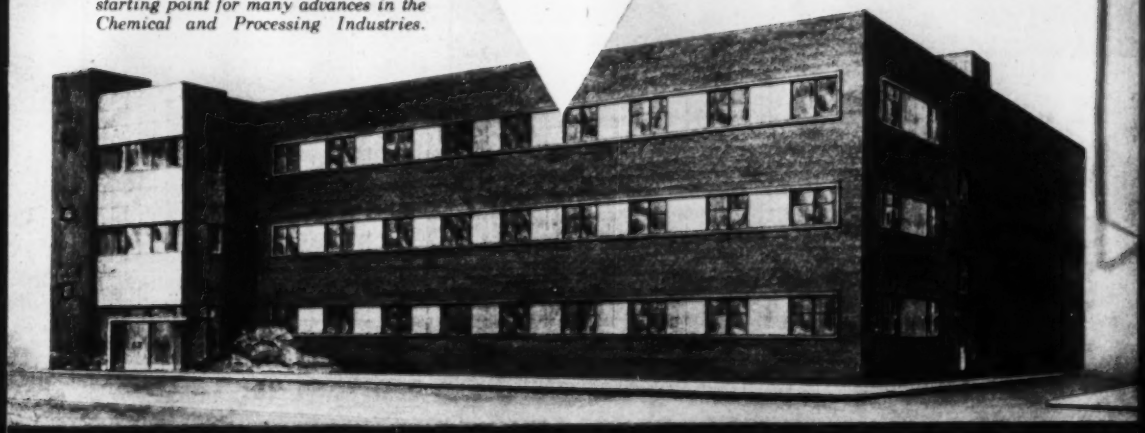
BALL AND ROLLER BEARINGS

IN EVERY INDUSTRY, SKF Puts The Right Bearing In The Right Place

This team can design, build and equip your plant!

Here is a team unique in the chemical and processing fields . . . a team of imagination and ingenuity, with years and years of experience in all phases of engineering. Thoroughly capable of carrying through any undertaking from flow sheet to turn-key operation—on a basis of unified responsibility. Big enough for the biggest job . . . flexible enough for *any* job. This team can competently and economically translate your ideas into an operating plant.

New Chemical Plants headquarters . . . starting point for many advances in the Chemical and Processing Industries.



CHEMICAL PLANTS DIVISION

BLAW-KNOX CONSTRUCTION COMPANY

PITTSBURGH 30 • TULSA 1 • NEW YORK 17 • PHILADELPHIA 3 • CHICAGO 3
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PLATEMANSHIP
H-VW-M's unique combination of:
. . . the most modern and complete laboratory for testing and development
. . . ability to provide complete equipment and materials for every plating and polishing need
. . . the complete background of knowledge and experience in every aspect of plating and polishing
PLATEMANSHIP

LOOK TO H-VW-M *PLATEMANSHIP*

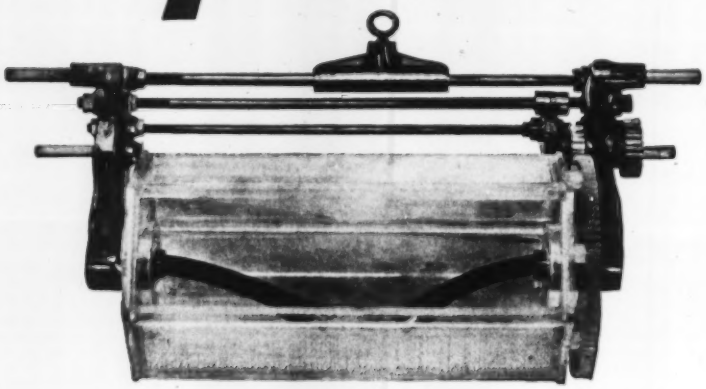
FOR THESE PLUS VALUES IN MERCIL TYPE PLATING BARRELS

. . . Availability in a variety of materials—Plexiglas, Merlon, Bakelite, hard rubber, depending upon the service

. . . Smooth functioning under continuous production

. . . Availability of cylinders in a variety of sizes and perforations with a wide choice of contacts

. . . Tripple-tie-rod-hanger construction



The wide variety of materials, sizes and contacts in which H-VW-M Plating barrels are supplied enables the user to select the exact type best suited to his needs. For example, Plexiglas cylinders with flexible danglers are recommended for operation through the entire cycle, acid or alkaline. Where increased production is the deciding factor, Merlon Ribless construction is supplied. If desired, barrels with pumping equipment are available to assure constant solution balance, thereby reducing the plating time.

What do these H-VW-M features add up to? Lower maintenance, lower production costs, a more uniform deposit—a better product more economically obtained. All these advantages are the result of *Platemanship*—H-VW-M's unique ability to meet and even anticipate the needs of the plating and polishing industry. They are covered specifically in Bulletin PB-107, ask for your copy.

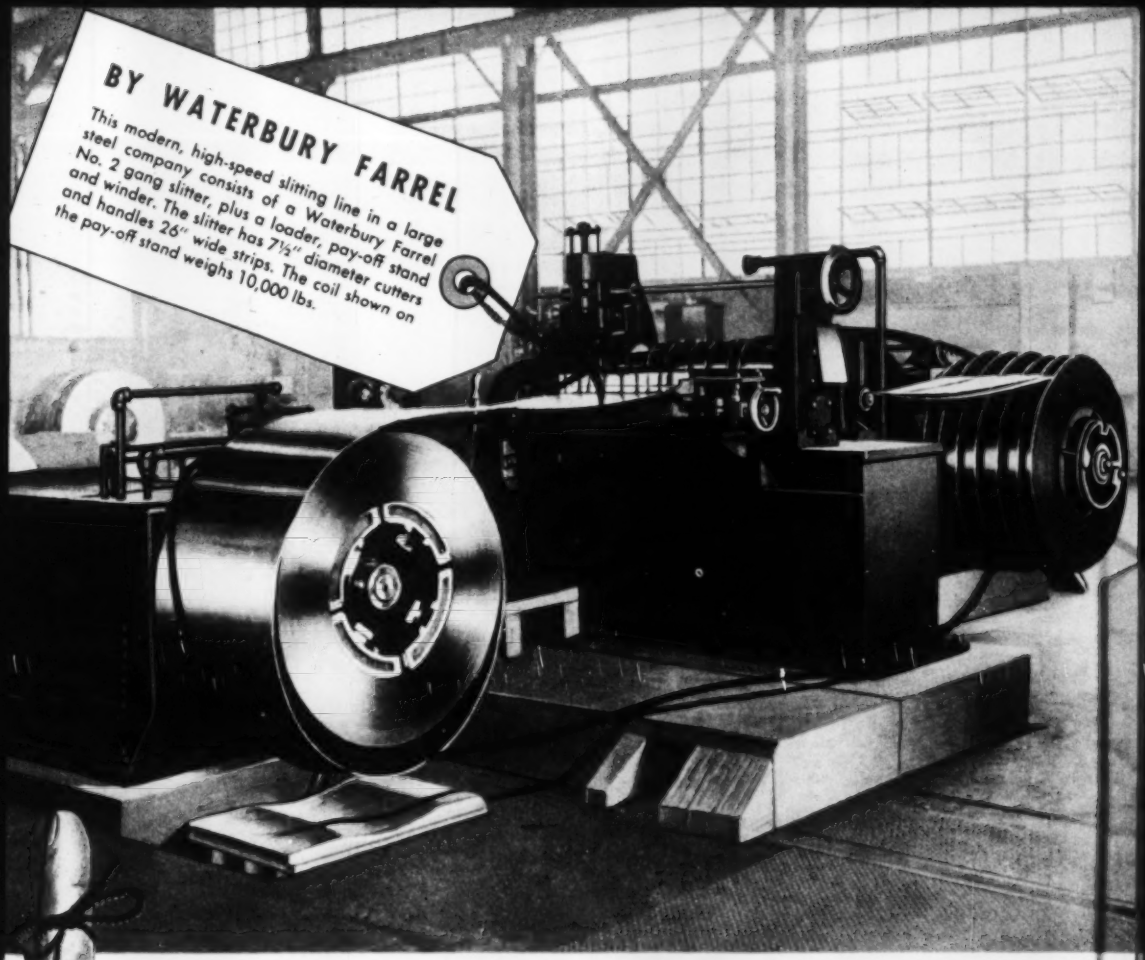
HANSON-VAN WINKLE-MUNNING COMPANY, MATAWAN, NEW JERSEY

PLANTS AT: MATAWAN, N. J. • ANDERSON, INDIANA • *SALES OFFICES:* ANDERSON • BOSTON • CHICAGO CLEVELAND • DAYTON • DETROIT • GRAND RAPIDS • MATAWAN • MILWAUKEE • NEW HAVEN NEW YORK • PHILADELPHIA • PITTSBURGH • ROCHESTER • SPRINGFIELD (MASS.) • STRATFORD (CONN.) • UTICA

H·VW·M

7621

INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES


BY WATERBURY FARREL
This modern, high-speed slitting line in a large steel company consists of a Waterbury Farrel No. 2 gang slitter, plus a loader, pay-off stand and winder. The slitter has 7½" diameter cutters and handles 26" wide strips. The coil shown on the pay-off stand weighs 10,000 lbs.

Remember this:

WHEN YOU NEED A MODERN ANSWER TO SPECIFIC SLITTING REQUIREMENTS

Many manufacturers are finding that slitting their own strip pays in time and dollars.

From Waterbury Farrel you can get modern, high-speed slitting machines fitted by type, size and accessory equipment to your specific requirements.

There are six standard sizes of Waterbury Farrel gang slitters capable of handling a wide range of gauges and widths. Accessory equipment such as loaders, pay-off stands, winders, coilers, backrolls, scrap cutters etc., are available to make the entire slitting set-up a Waterbury-Farrel "package".

Special attachments can be "engineered-in" when necessary to adapt the slitters to special applications.

Phone, write or wire for complete information.

WATERBURY FARREL FOUNDRY & MACHINE COMPANY

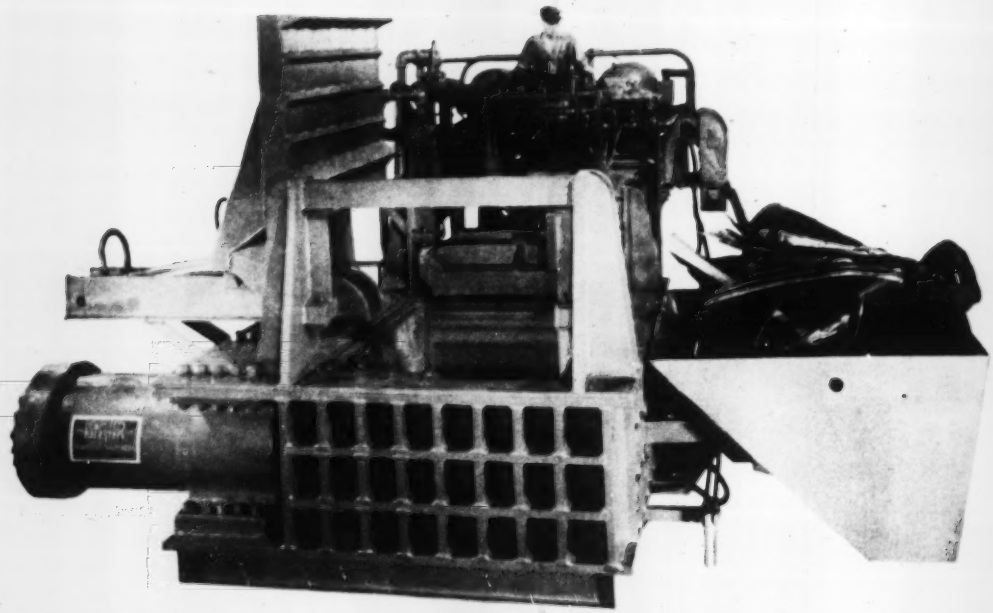
WATERBURY, CONNECTICUT, U. S. A. • *Sales Offices:* Chicago, Cleveland and Newark

WF-1

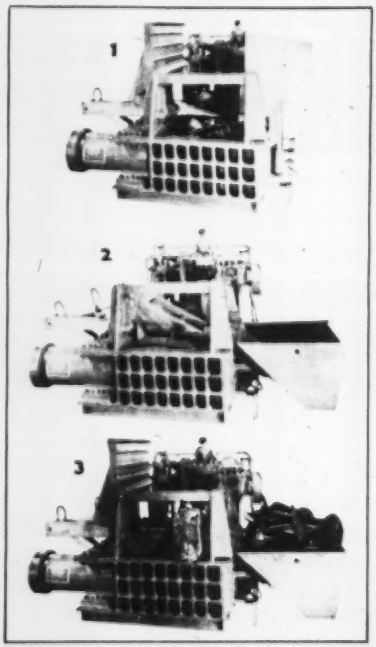
A FEW OF THE MANY TYPES OF METAL WORKING MACHINERY MADE BY WATERBURY FARREL

COLD PROCESS BOLT AND NUT MACHINERY — Headers (all types) • Re-headers • Trimmers • Thread Rolling Machines • Slotters • Nut Tappers, etc. POWER PRESSES — Crank • Cam and Toggle; also Rack and Pinion Presses Transfer Presses • Multiple Plunger Presses including Horizontal Drawing Presses and Eyelet Machines, Hydraulic Presses, etc. MILL MACHINERY — Rolling Mills • Wire Flattening Mills, Chain Draw Benches • also Slitters Straighteners • Pointers • Swagers • Cut-off Saws • Coilers • Winders and related equipment. WIRE MILL EQUIPMENT — Continuous Fine Wire Drawing Machines • including Upright Cone and Tandem Wire Drawing Machines • Bull Blocks • String-up Machines • Spoolers, etc.

In Equipment, Experience Counts
We're 100 in '51



The DEMPSTER-BALESTER gives you the nearest thing to Automatic Baling!

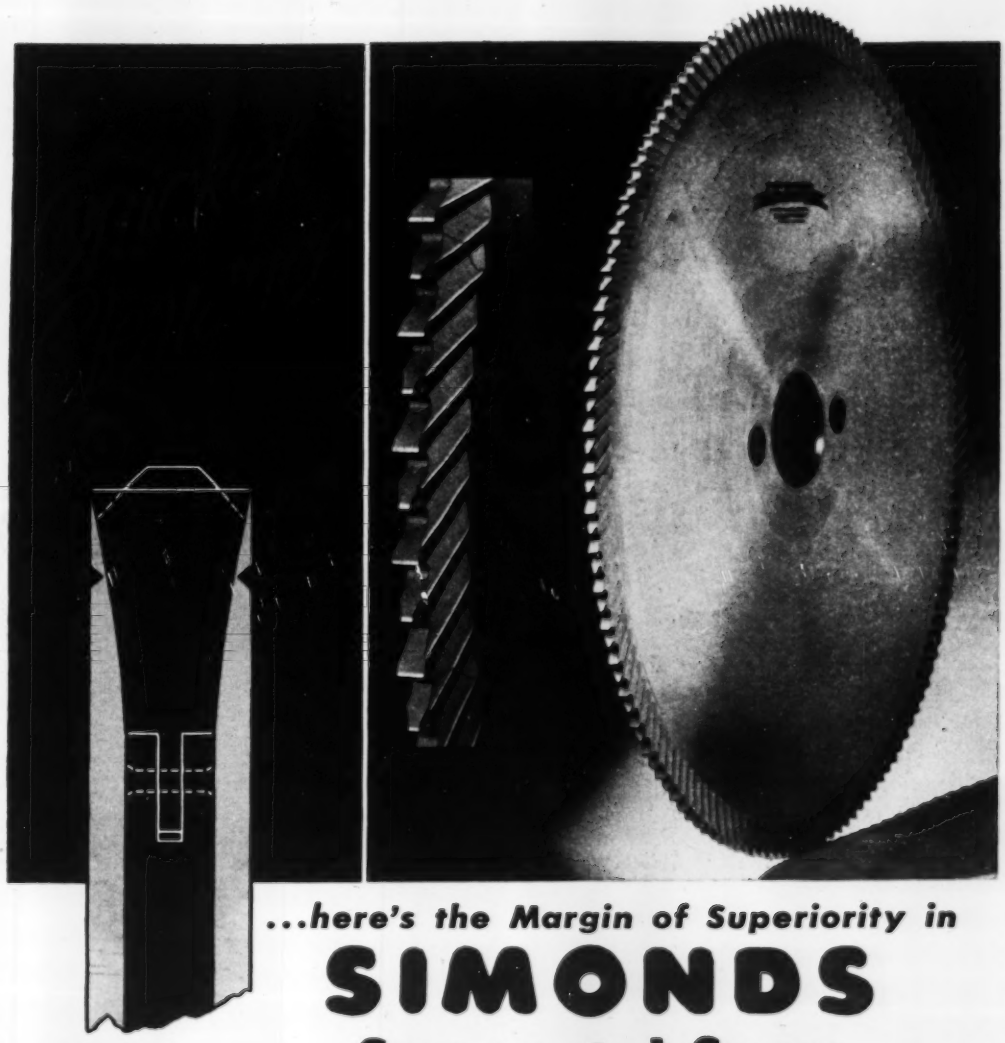


The Dempster-Balester, with Auxiliary Compression Door and Skip-Pan Loader combination, offers you the nearest thing available to automatic baling. Every phase in the baling cycle is operated by hydraulic controls from the moment scrap metal is dumped into the Skip-Pan Loader until the finished bale is ejected.

Large photo above shows the big capacity Dempster-Balester Model "600" with Skip-Pan loaded. The three phases in the continuous baling operation are shown at left. 1—Skip-Pan dumps scrap into charging box. 2—Auxiliary Compression Door compresses scrap with a 45-ton force while Skip-Pan returns for re-loading. 3—Compression Door completes compression cycle. Charging box door closes and scrap is baled. Finished bale is ejected and Skip-Pan is ready to dump another load into charging box.

This Dempster-Balester "600" turns out 8 to 9 tons of baled scrap per hour with the Auxiliary Compression Door and Skip-Pan Loader combination. The door completely eliminates in some operations, and materially reduces in others, the costly process of tying up two or three extra men as arrangers. For complete information on how to bale your scrap at lowest cost, write to us today! A product of Dempster Brothers, Inc.

DEMPSTER BROTHERS, 622 Dempster Bldg., Knoxville 17, Tenn.



...here's the Margin of Superiority in

SIMONDS

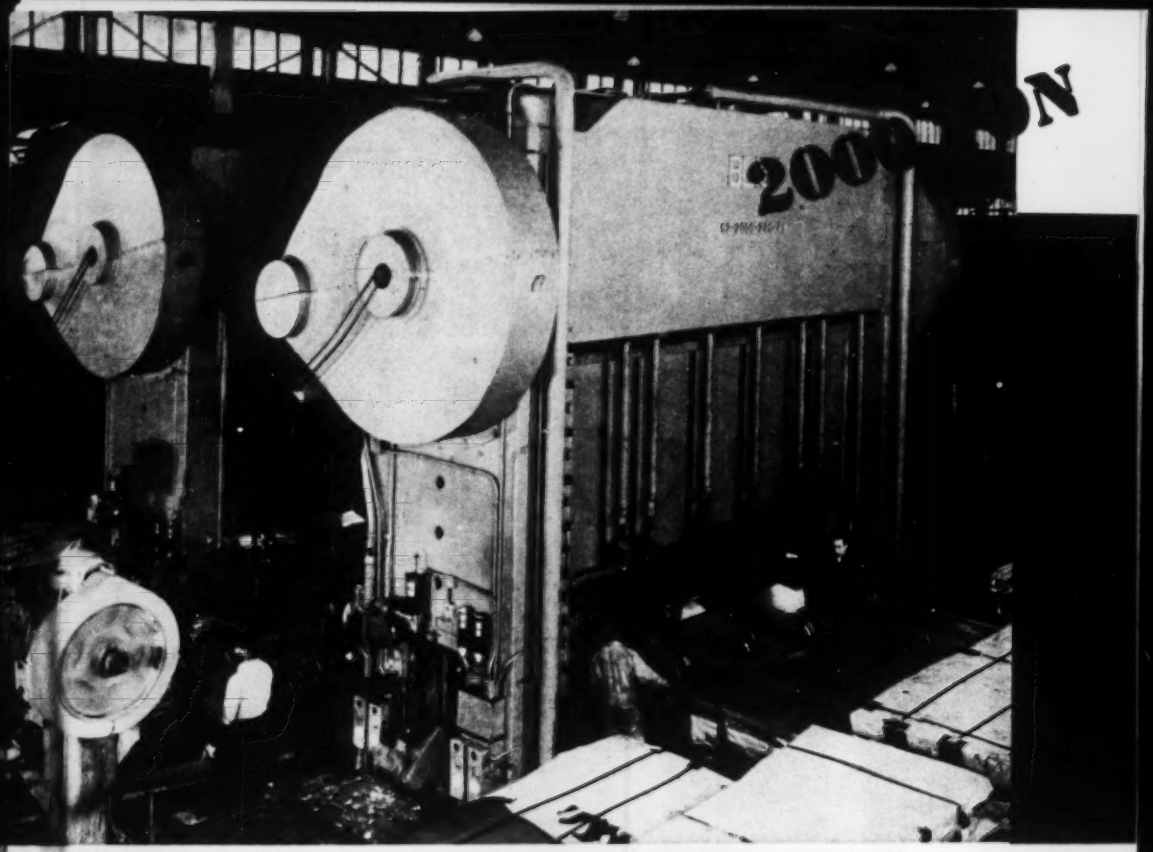
Segmental Saws

See the extra margin of clearance which gives this saw less side-drag, less power consumption and lower heat-generation than any other saw designed for production cutting... on jobs where a smooth cut is required or where fine teeth are necessary on light walled sections. In Simonds design, High Speed Steel segments are riveted into a tough alloy steel plate, giving far greater strength to the saw as a whole. And the alternate beveled and square teeth produce "Tri-vided" chips for faster, easier cutting. This combination of features gives you a metal-cutting saw that cuts straight and true under heavy feed.

Simonds Segmental Saws are one of THREE TYPES in the Simonds Line of Metal-cutting Saws for ferrous and non-ferrous applications. From a complete range of sizes in Segmental, Inserted Tooth and Solid Tooth Saws, Simonds is able to give you an unbiased recommendation for the type of saw best suited to your particular type of work. See your Industrial Supply Distributor today.

SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASS.

Factory Branches in Boston, Chicago, San Francisco and Portland, Ore. Canadian Factory in Montreal, Que.



2000-ton Bliss presses, recently installed, form and trim heavy rails at the Dearborn plant of the Ford Motor Company.

New Bliss Heavy-Tonnage Presses Join Ford Production Lines

Ford production lines' ever-increasing efficiency and reliability are no accident. They embody intensive studies of advanced equipment and techniques—especially in heavy-tonnage forming where improvement gives substantial savings. A case in point is the *new rail press line*—five Bliss 2000-ton presses recently installed by Ford.

Unusual design features provide capacity to spare and protection against downtime even with steady 'round-the-clock operation:

- Extra-deep crown, bed and slide members minimize deflection
- Crankshaft construction withstands most severely unbalanced loads
- Crankshaft jointed at center; simplifies maintenance, cuts down on floor area needed
- Twin pinions and intermediate gears distribute load on intermediate shafts
- Oversize crankshaft, clutch and brake reduce possibility of downtime

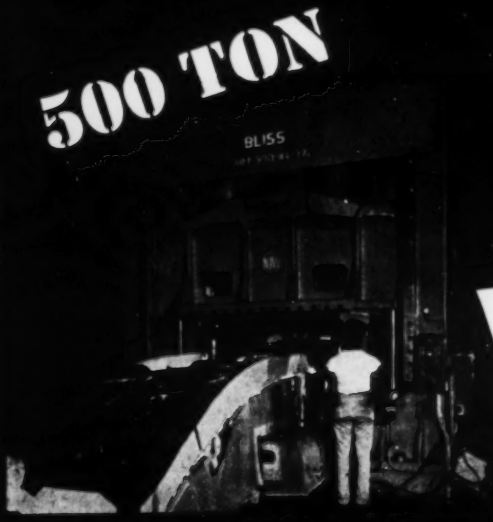
These design highlights show how Bliss' creative press engineering is applied to particular metal forming operations. You can get Bliss started on *your* special press engineering by calling your local Bliss representative. Virtually a production counselor for metal stampings, he is your liaison with Bliss' engineering staff, can recommend equipment and methods ...advise you on production rates and costs.

E. W. BLISS COMPANY, CANTON, OHIO

E. W. Bliss (England) Ltd., Derby, England

E. W. Bliss Company (Paris), St. Ouen sur Seine, France

Presses, Rolling Mills, Special Machinery



For Heavy-Tonnage Presses—

Mechanical or Hydraulic...

It's Bliss

"Tycol Anepro carries heaviest loads... lowers bearing failure... slices lubrication costs"

Indeed it does! Tycol Anepro Greases measure up to severest shock-load conditions encountered in the rolling of steel. They protect bearings from moisture, heat, and abrasive impurities. Anepro's exceptionally high film strength and non-corrosive properties result in far longer bearing life . . . faster rates of production . . . minimum down-time for heavy-duty equipment.

Call or write today for complete information from your nearest Tide Water Associated office.

TYCOL

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TIDE WATER ASSOCIATED OIL COMPANY

17 BATTERY PLACE - NEW YORK 4, N. Y.

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DoALL
BAND MACHINES
BAND TOOLS
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PRODUCTION NEWS
SAW BANDS • GAGING EQUIPMENT • TOOL STEEL • CUTTING TOOLS • INDUSTRIAL SUPPLIES

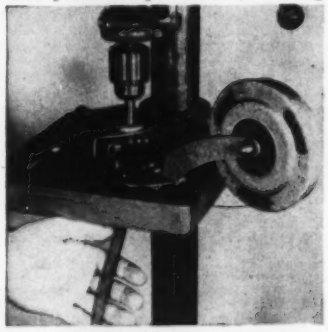
Vol. 1 Published by The DoALL Company, 254 N. Laurel Ave., Des Plaines, Illinois No. 2

DoALL CONTOUR-MATIC SPEEDS MACHINING OF AIRCRAFT FORGINGS, ELIMINATES NEED FOR $40,000 OF ADDITIONAL MACHINE TOOLS

Spring-Master Attachment Turns Drill Press Into Low Cost "Spring Factory"

Less Than 7 Minutes Required to Set Up for Making Compression or Extension Springs

A new, high speed, low cost spring-making device for attachment to drill presses is now available. In less than seven minutes the easy-to-operate Spring-Master can be mounted on a drill press and put to work winding



Spring-Master mounted on drill press.

springs from wire diameters of .021 through .071. Spring-Master helps avoid assembly delays because it can be used for making production springs. It saves time and money by making development springs for trials or product improvement. It reduces down-time on production machines because it can be used for making replacement springs.

The Spring-Master is a high speed unit which has produced as much as 685 feet per hour of closely wound coils of .040 wire. The operation can be mastered by unskilled labor and one person can often handle two units at a time.

This new machine can be attached to any drill press. A special looping tool for making either full or double loops or hooks is included.

For a demonstration—or literature—call DoALL.

Band Machine Rough Cuts Parts To Shape Eliminates Annealing, Rough Milling

Faced with the problem of stepping-up machining production on vital aircraft forgings, the A. W. Hecker Co., Cleveland, Ohio either had to invest $40,000 to $50,000 for additional milling machines, or look for a better, faster way to do the job. The solution, and only about 1/10 as costly, was using a DoALL MP-20 Contour-matic band machine.

These 4140 aircraft forgings were formerly torch cut, annealed, rough milled and finished milled. Now the parts are drilled, sawed to shape on the Contour-matic and then finished milled. The additional output required has been created entirely by the Contour-matic. The existing milling machines are easily capable of handling the finishing work now that the major part of the stock removal is handled by band sawing.

The Contour-matic is particularly advantageous on production work because all movements are hydraulic and automatic, making possible faster, more accurate work with less operator fatigue. Speed range of the machines is 40 to 10,000 blade feet per minute.

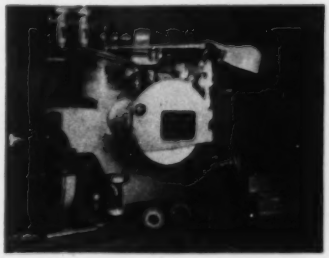
The DoALL Contour-matic cuts any material to any desired shape. It not only saves time and money, but also valuable metal. DoALL band machining *slices* the material apart instead of reducing it to a pile of chips. The metal saved can often be used for making other parts, tools or dies. The Contour-matic uses precision DoALL band tools that handle any sawing, filing, grinding or polishing job on all ferrous, non-ferrous and all non-metallic materials.

Close-up of sawing fixture developed by customer for production cutting of aircraft forgings.

Your DoALL Sales-Service Store will conduct a free demonstration of DoALL band machines in any plant. Literature is also available.

New Gear Generating Attachment For Surface Grinder To Be Featured at ASTE Show

Visitors to the DoALL Booth at the ASTE show March 17 to 21 in Chicago will see for the first time how gears can be quickly and easily made on a DoALL Surface Grinder with the aid of a new gear generating attachment. This new unit requires only one simple set-up to produce gears up to 6" in diameter with any pressure angle desired, and any number of teeth up to 100. Gears can be made from either solid or precut blanks and the only accessories needed are gage blocks and sine bar. Masters, base cylinders, racks, etc., are not required with this attachment. The exhibit will also include demonstrations of band machines, gages, cutting tools and specialties.



"DoALL Surface Grinder Saves Terrific Amount of Grinding Time," Says Tool Room Foreman . . .

Removes Stock Faster — No Burning or Warping — Repeats Accurately — Lengthens Wheel Life

Mr. William R. Henninge, Tool Room Foreman of the Euclid Plant of Reliance Electric and Engineering Co., Cleveland, credits the extra rigidity and precision accuracy of DoALL Surface Grinders for helping to save much grinding time on a large lamination die punch assembly. Foreman Henninge goes on to state that their DoALL Surface Grinder gave maximum performance because of its ability to hold size properly and repeat accurately. And in addition, the variable hydraulic feed control made it easier for them to attain proper table speeds and grinding stroke length.

The DoALL grinder at Reliance is also equipped with DoALL Cool-Grinding* attachment which added more efficiency to this die grinding job. Cool-Grinding made possible faster stock removal without burning. Stock used on this job was mostly high carbon-high chrome. Punch warpage was reduced, especially on thin punches. And, as a bonus feature, wheel form life was twice as long between dressings.

In Cool-Grinding coolant is metered into the wheel hub, flows through the pores of the wheel and out in a fine mist at the point of contact of the wheel and the work. Thus both the wheel and the work always have coolant present. Cutting temperatures are reduced as much as 400° F.

Get a DoALL grinder demonstration.

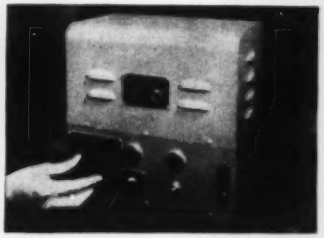
View of surface grinder operator working on piece for lamination die punch assembly.

It will show you how any surface grinding job can be done with greater savings in time, material and money. Local DoALL Sales-Service Stores are equipped to demonstrate DoALL Surface Grinders in any plant. A new, revised DoALL Grinder Bulletin is also available.

*U. S. Patent No. 2470350.

Variable Control and Demagnetizer are Features of DoALL "Selectron" Magnetic Chuck Control

Originally developed for use with DoALL Precision Surface Grinders, The DoALL "Selectron" magnetic chuck control has proved to be a welcome addition to other machine tools equipped



with magnetic chucks. The Selectron permits varying the chuck holding power to exert just the right amount of pull to hold heavy pieces for heavy cuts or thin pieces for light work. The Selectron's ability to hold thin work pieces with a low rate of pull over the entire surface is most helpful in preventing distortion during machining. The control also provides 10-second demagnetization of the chuck and work piece after the machining operation is completed.

The DoALL Selectron is a compact unit with four full-wave rectifier tubes for direct current and a special circuit breaker for protection against overloads or voltage surges. Simple dial and switch controls make it easy to operate. Complete information and literature are available upon request.

DoALL Vertical Line-Grinding Salvages $1500 Worth of Spoiled Gears

Many Repairs, Tool and Die Jobs, Production Runs Can Be Done Faster and Better by Grinding on a Band Machine

Vertical line-grinding on a DoALL MP-20 Contour-Matic Band Machine proved to be the answer to a manufacturer's prayer recently when a run of gears came through in which the keyways had closed up during heat treating. The problem was one of finding an economical, speedy means of remachining the hardened keyways.

DoALL Line-Grinding applied to air-cooled engine castings.

Vertical line-grinding was the only logical answer. The DoALL line-grind tool consists of hundreds of abrasive segments mold-welded to a spring temper steel band. It is installed and operates on the band machine in the same manner as an ordinary saw band. Because of the controlled feed pressure, tool speed and coolant application required, the line-grind band can be used only on the DoALL Contour-matic.

DoALL line-grind bands will cut greater work thicknesses than will a wheel, which grinds only the work area tangent to it. Further, there is no limit to the depth of cut possible with line-grinding. It is the first and only cutting tool and band machine combination that will do precision vertical grinding on outside, inside or contour cuts. Die shops, among others, have always had the need for just such a grinding method in order to meet production runs faster and be assured of saving valuable dies that break, warp or require last minute alterations.

Local DoALL Sales-Service Stores will demonstrate vertical line-grinding in any plant, upon request.

Close-up of DoALL Line-Grind Bands showing abrasive segments.

Versatile Band Machine Friction Saws Plates, Cuts Wood, Saws All Metals, Plastics

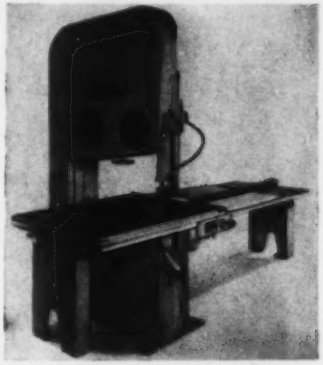
DoALL 36W Zephyr has 40 to 10,000 F.P.M. Speed Range, 36" Throat, 20" Work Clearance

There is practically no limit to the jobs that can be done on the DoALL 36W Zephyr band machine. Foundries use it for friction sawing castings; woodworking plants use it for high speed precision contour sawing; other plants use it to trim stampings, cut plastic shapes, make tools and dies, notch and slot parts, handle production and maintenance jobs. No other band machine combines such versatility with comparably large work capacity. The 36W is built rugged with a full 36" throat and 20" clearance under the saw guides. Large work pieces up to 1 ton, such as die blocks, castings, beams, forgings or plates are easily handled by this time, money and material saving machine.

Hydro-Feed Adds Efficiency

When equipped with a DoALL hydraulic stroke feed table, any straight sawing job can be done more quickly and easily on the 36W. With the DoALL Hydro-Feed work is locked to the table, the feed and pressure controls are set and straight cutting is done automatically and accurately with little or no operator effort.

The DoALL Hydro-Feed table comes in two stroke sizes, 16" and 36". The 36" stroke table (see cut) measures 40" x 48" and has four ½" full length "T" slots. Feed rate is 0 to 12 F.P.M. forward and 36 F.P.M. reverse. The machine is powered by a 10 H.P. motor with a 3 speed transmission and the table feed is driven by a ¾ H.P. hydraulic pump motor.



DoALL 36W Zephyr Band Machine with "Hydro-Feed" hydraulic stroke work table.

Local DoALL Sales-Service Stores will demonstrate the 36W Zephyr in any plant, without cost or obligation. For such a demonstration, or literature, call today.

16 Kinds of Saw Bands Available For Any Vertical or Horizontal Band Saw

All vertical or horizontal band saw users can now get immediate delivery of DoALL saw blades for sawing, cutting or friction sawing any ferrous or non-ferrous metal and most all non-metallic materials.

This complete line, carried in stock by DoALL stores throughout North America, includes 16 different types of band tools. Woodworking shops, metal shops, paper fabricators, anyone using a band machine will find real economy with longer-lived DoALL saw bands. DoALL saw bands can be purchased in 100 ft. lengths in the exclusive "strip-out" metal box for safety, convenience and blade protection, in 500 ft. packaged coils, or specially cut and welded lengths to fit your machine.

CALL DoALL...

DELIVERY FROM 33 SALES-SERVICE STORES THROUGHOUT THE COUNTRY

GREATEST SELECTION OF
PRECISION GROUND
OIL HARDENING **FLAT STOCK**
AVAILABLE ANYWHERE!

The DoALL Company
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SEND FOR GROUND FLAT STOCK SIZE CHART AND BULLETINS

DoALL

OVER 230 SIZES

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CONTOUR SAWING MACHINES • SURFACE GRINDERS • GAGES • CUTTING TOOLS & INDUSTRIAL SUPPLIES

Two New Educational Textbooks Explain Band Tool Selection and Use — Precision Measurement with Gaging Equipment

DoALL Band Tool Manual

This 160 page book contains a complete and comprehensive discussion of the fundamentals of selection and use of saw bands and other band tools. It deals with dimensional accuracy, surface finish, production rates, tool life and many other factors to help broaden the "know-how" of band sawing and machining.

All 16 types of DoALL band tools for sawing, friction sawing, slicing, filing, grinding, honing and polishing all metals, plastics, woods, glass, ceramics, stone, leather, paper and other nonmetallics are described and illustrated in actual use. Recommendations are also given regarding band tool selection as concerns, speeds, pitches, feeds, coolants and other related factors necessary for cutting any material. This information is extremely helpful in stepping-up production rates and correcting various production problems. This manual is a practical guide for anyone concerned with the operation of band tools.

This $2.00 book is available free to persons requesting it on their company letterhead.

The "Science of Precision Measurement"

This entirely new 256 page manual explains the purposes and application of gage blocks, sine bars, optical flats, monolights, electric comparators and statistical systems for the effective use of the standard inch in mechanical production.

Illustrated throughout with two color diagrams and photographs, this book introduces a new method of measurement using optical flats and the "Visible-Scale." It shows how to measure and establish angles, surface flatness and parallelism and other inspection procedures invaluable to quality control engineers, supervisors, production and tool inspectors. No other publication is more comprehensive in its presentation of these quality control subjects.

This $3.50 book is available free to engineers, inspectors or executives who request it on their company letterheads.

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No. 2—BBM—2-52

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BUILDING A GREATER AMERICA

Every dot on the draftsman's sketch has real meaning for the workmen in the boiler shop at Sun Ship as they assemble a tempering kiln 9' I.D. and more than 47 feet in length.

A newspaper humorist some years ago "defended" the efficiency man, saying that he could probably do a job as well as the next man "if you gave him time to doodle a ream of blueprints."

Well, there's always time for a chuckle, even in a plant as big and busy as Sun Ship. But there's also appreciation of the part the draftsman's "doodles" play in the good old motto of *Plan Your Work—Work Your Plan.*

Many a time in Sun Ship's 36 years of growing, good drafting has been the key to special service for the company's customers. A clearance drawing has revealed a way of speeding shipment by a change of route. A print has shown that parts of a piece of equipment being rebuilt could be made right in Sun Ship's versatile plant . . . and save valuable time.

And of course, even routine operations of draftsmen fit right into Sun Ship teamwork . . . for the drawing is a translation of facts into language readable by workers . . . and the "doodles" of structure, fittings, wiring, etc. have put a feather in Sun Ship's cap by helping speed the building of many a machine that helped build a greater America.

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SINCE 1916

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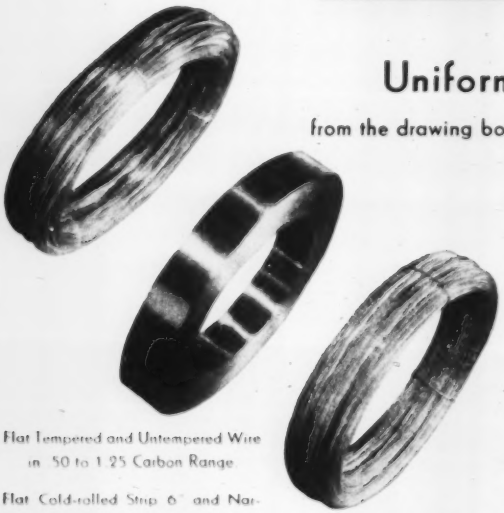

Uniform Quality demands positive "know-how" from the drawing board to the finished product.

Washburn craftsmen, through years of experience, know exactly what is needed to meet the requirements of each specified job, no matter how exacting.

Insure the quality of your product by depending on Washburn.

Flat Tempered and Untempered Wire in .50 to 1.25 Carbon Range

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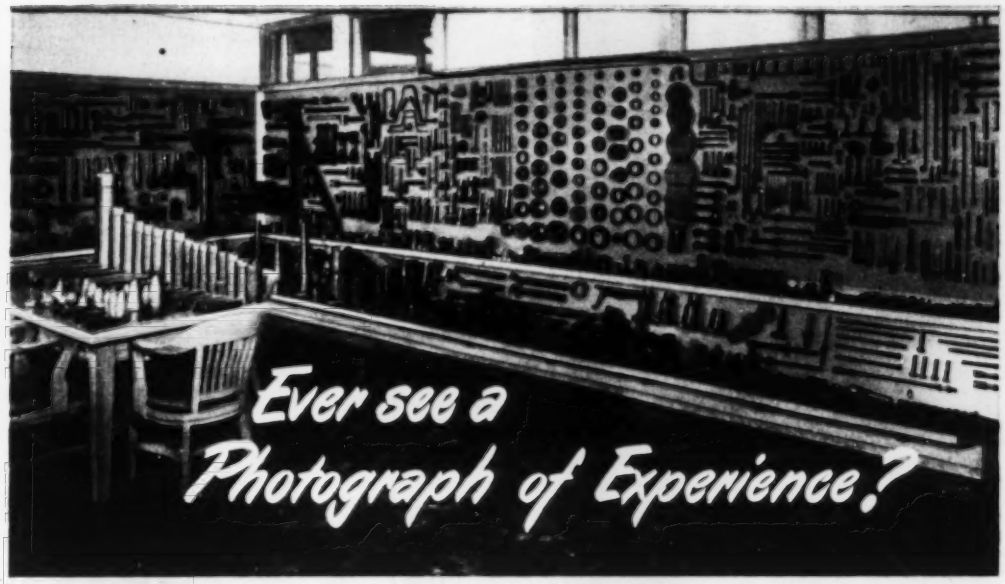

Experience is generally thought of as being something intangible. But this photograph of our display room portrays experience in the form of tangible solutions to countless forging problems – solutions obtained through cooperation between industry and National's engineers.

Our leadership in pioneering methods and applications for the forging industry establishes our ability to help you best.

THIS DOOR IS ALWAYS OPEN

Our entire organization is always at your service. Send us prints or a sample of the part you wish to forge—hot or cold, large or small. Better yet, pay us a visit.

No obligation, of course.

NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO—SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

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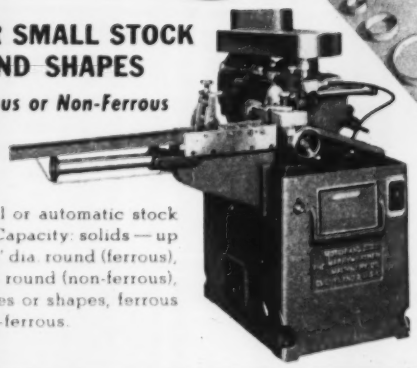
It's the Cost per Cut that Counts..

REDUCE YOURS BY USING THE Triple-Chip METHOD

Motch & Merryweather offers circular sawing machines to cut off any size or shape of metal from titanium to magnesium, including high-speed machines for all non-ferrous metals. Triple-Chip saw blades with "Hi-Lo" features deliver square, burrless ends accurate to length. M. & M. automatic blade grinders impart the correct cam-generated tooth form for maximum results. May we present a convincing time study for your operation?

— FOR SMALL STOCK AND SHAPES

Ferrous or Non-Ferrous



Manual or automatic stock feed. Capacity: solids — up to 1¼" dia. round (ferrous), 3" dia. round (non-ferrous), 3" tubes or shapes, ferrous or non-ferrous.

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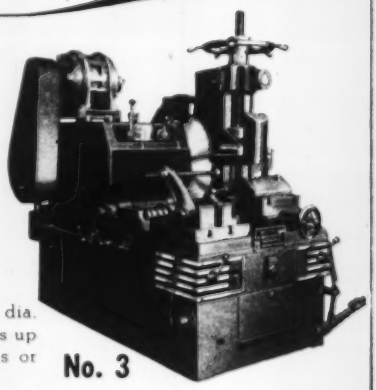

Capacity: up to 9⅝" dia. round; structural shapes up to 18" I-beam. Ferrous or non-ferrous.

No. 3

...also 2 still larger sizes —

No. 4 Capacity: up to 16½" dia. round; structural shapes up to 24" I-beam. Ferrous or non-ferrous.

No. 5 Capacity: up to 30" dia. round. Ferrous or non-ferrous.

Besides time studies, descriptive bulletins are yours for the asking.

Manufactured by

THE MOTCH & MERRYWEATHER MACHINERY COMPANY

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Builders of Circular Sawing Equipment, Production Milling, Automatic and Special Machines

Only M & M builds ALL 3: CIRCULAR SAW SAW BLADES BLADE GRINDERS

PRODUCTION-WITH-ACCURACY MACHINES AND EQUIPMENT

RESISTANCE WELDING HIGH-TEMPERATURE ALLOYS?

General Electric can help you in the proper selection of resistance welding control—single-phase and three-phase

Are you faced with resistance welding high-temperature, high-strength alloys or aluminum for defense production? Trying to decide between three-phase and single-phase welding control? Write for G-E literature that describes both types. We know, from experience in our own as well as customers' plants, that both are being used. Which *you* select will depend to a great extent on these factors:

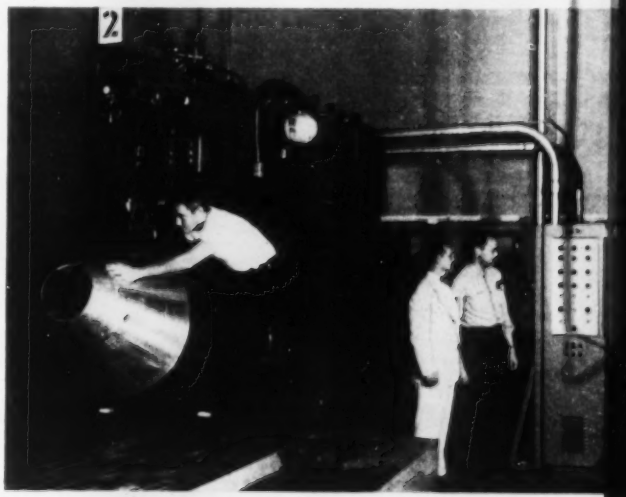
COMPARE SINGLE-PHASE AND THREE-PHASE

Single-phase	Three-phase
1. Low initial cost	1. Low KVA demand
2. Low maintenance (easy)	2. Balanced 3-phase load
3. Simple to operate (few adjustments)	3. High power factor
4. Wide industry use	4. Inherent slope control action
5. Voltage and current regulators can be added later	
6. Slope control can be added if necessary	

General Electric has supplied, and used, both types to meet Army-Navy specifications, and our nearest local office can give you information based on experience with this equipment and with welding high-strength alloys. Before you buy—investigate. Write for bulletin GED-1512, or contact the nearest G-E sales office. *General Electric Company, Schenectady, N. Y.*

Ask your resistance welding manufacturer, power supplier, or nearest General Electric office for a FREE showing of the sound and color movie, "This Is Resistance Welding." Describes various welding methods and processes. For production and engineering personnel training and refresher courses.

H. C. Wolfe, of the General Electric Electronics Laboratory Welding Section, says, "Tests in our Laboratory and in other General Electric Welding Laboratories showed that single-phase a-c welding using Slope Control was as good as three-phase welding on aluminum. So, for Class A spot welding of aluminum, the use of our a-c machine with Slope Control certified to Military Specification MIL-W-6860 for .125-.125" 52S$^{1}_{4}$H aluminum has resulted in a considerable saving of money and time."



Three-phase at Ryan Aeronautical Company in San Diego controls several of the largest resistance welding machines in the country. With G-E 3-phase control exact heat settings can be obtained and duplicated later without variation. Uniform current is fed to the electrodes to produce the required heat with less momentary line load. Unidirectional spot-welding is also obtained—advantageous when welding sheets of different thicknesses.

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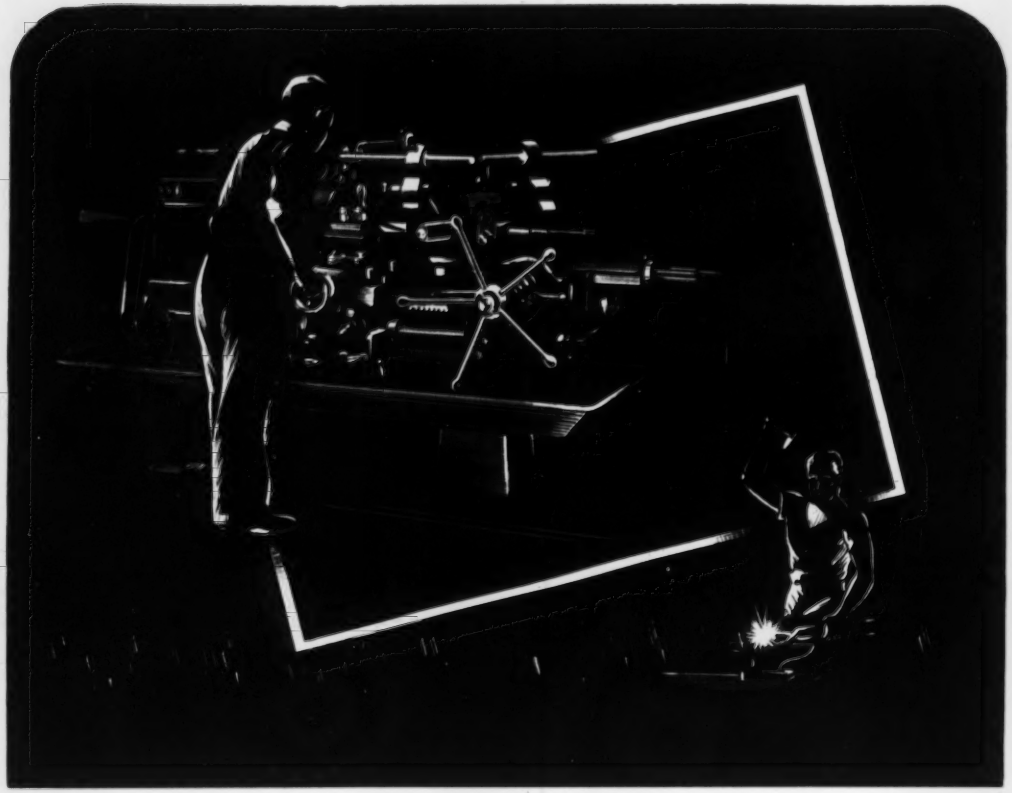

SINCE 1850

THE METAL WORKING INDUSTRY

in its advance from the crude processes of the blacksmith shop to modern precision machine tools, has been paced by the production and transportation of the ores which have made that progress possible.

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are cleaned at production line speed by Vapor Degreasing

FROM ALUMINUM MICROPHONE CASTINGS PRIOR TO ASSEMBLY . . .

Vapor degreasing removes oils and grease from intricate castings in less than a minute . . . leaves parts clean, warm and dry—ready for inspection and assembly.

. . . TO STAMPED LOUD SPEAKER FRAMES READY FOR PAINTING

Heavy grease is thoroughly removed from loud speaker frames prior to painting. Vapor degreasing speedily cleans parts of any size, shape or metal . . . keeps production high in electronic equipment manufacture.

Electronic equipment manufacturers process metal parts of all sizes and shapes. Production rates are high. Vapor degreasing with Du Pont "Triclene" D Trichlorethylene meets the demand for speedy, one-step metal cleaning of intricate parts before inspection, assembly, further fabrication or finishing of any type. The heaviest oils and grease are thoroughly removed—usually in less than a minute!

Compact vapor degreasing units are available for a wide range of capacities and can be adapted to manual or mechanized operation. Degreasing equipment can be used alone or as part of a process flow line. The final cleaning step in each unit—passing the parts through pure "Triclene" D vapors—leaves parts instantly ready for the next process. And the cost of vapor degreasing remains low, since contaminated solvent can be readily recovered for economical re-use.

"Triclene" D has been used for metal cleaning by thousands of plants for many years. It's stable and pure . . . stands up under moisture, air, heat and other destructive influences. With it comes complete Du Pont service and the benefits of experienced technical help in your metal cleaning program.

The coupon below will bring you all the facts about vapor degreasing with "Triclene" D.

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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Mail the coupon below for more facts on vapor degreasing.

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Please send me detailed information on Vapor Degreasing: applications, advantages, equipment used, and Du Pont solvents available. We are interested in cleaning _____ products.

Name _____ *Position* _____

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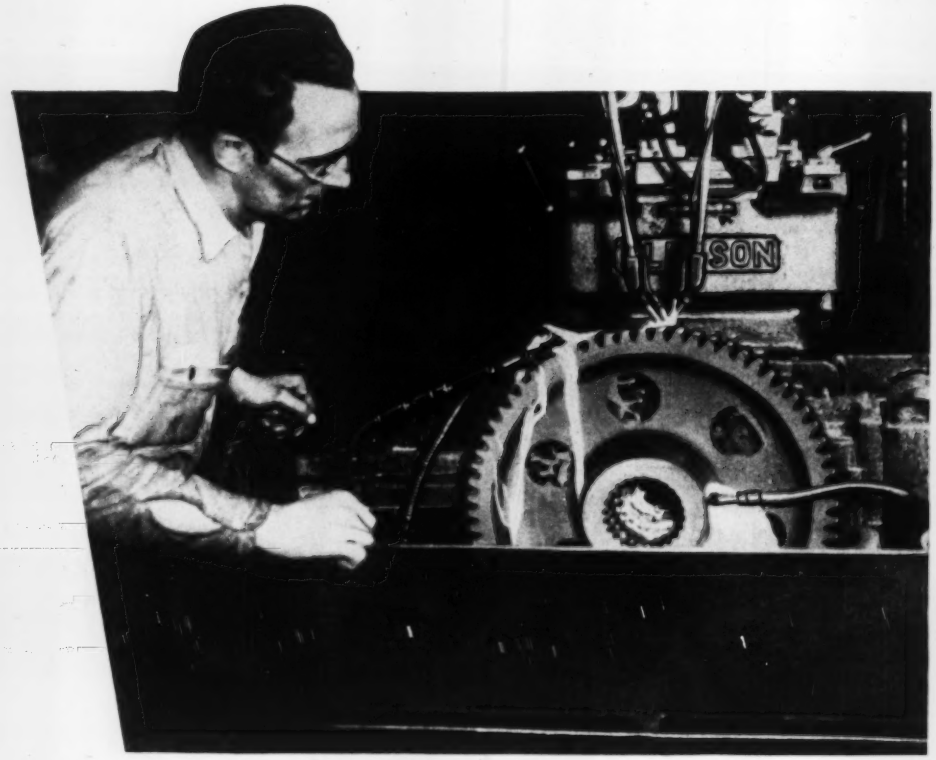

flame-hardening ✦ ✦ ✦

. . . a process for hardening ferrous metal surfaces.
It permits the hardening of gear teeth, thus increasing wearability,
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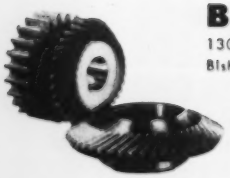
resistance to impact are undisturbed.

- At BRAD FOOTE, flame-hardening, and every other operation from design to shipment of finished gears, is done in our own plant—by our own skilled workers. No one shares our responsibility.

- When you order BRAD FOOTE gears, you know for sure they will give long, satisfactory service in your shop—or on the equipment you sell to others. BRAD FOOTE makes gears . . . good gears . . . for a world at work—or at war.



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Take advantage of exclusive P&H AC Dial-lectric principle

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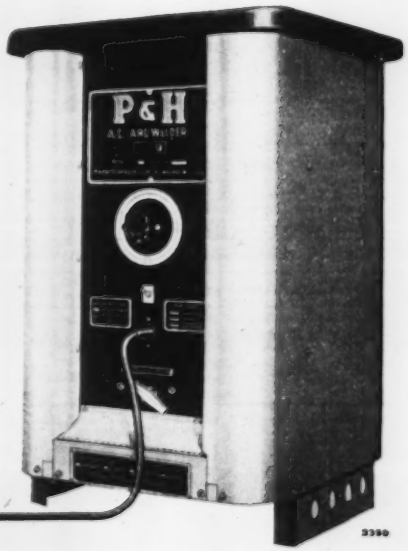
— with safe, open-circuit voltage . . . easy, quick-start arc . . . time-saving, built-in remote control . . . compact AC design

Armor plate welding calls for low-hydrogen or stainless steel electrodes. P&H, pioneer in the low-hydrogen field, also offers the AC welder that gives you the best weldability with these rods — for greater production.

Your men like the P&H AC Dial-lectric — like its safety under the most adverse conditions; like the easy, quick-start arc, the elimination of arc-blow. And they get more done! Get sounder, better looking welds in less time, thanks to built-in remote control which lets them select the right heat at the work, turns *walking time* into *welding time*.

Because these welders give production such a lift, P&H has stepped up its delivery schedules to meet defense demands without delay. Get your production rolling in high gear. Order your P&H AC Welders today. Capacities up to 650 amps. Take advantage of this delivery situation while it lasts.



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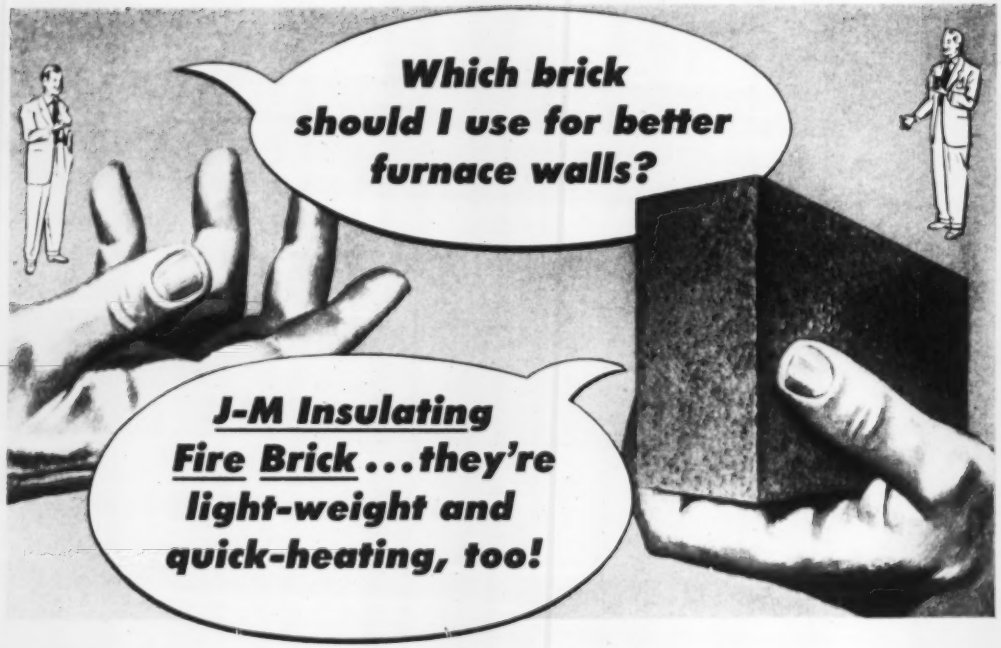

6 types . . . for savings in services up to 3000F

Because of their quick-heating and low-heat transfer characteristics, Johns-Manville Insulating Fire Brick are efficient fuel-savers for use at operating temperatures up to a full 3000F on the insulation.

Each type of J-M Insulating Fire Brick has the correct balance of thermal and physical properties that assures maximum economies within a specific temperature range. All types are *quick-heating* . . . operating temperatures are reached in a short time, thereby saving fuel.

Identical materials can also be obtained in large size units known as Johns-Manville Insulating Fireblok. Fireblok have the same properties as the brick, but are made in extra large sizes for added construction economies. The large units can be installed faster . . . require fewer joints and less bonding mortar. During rebuilding or repair, furnace down-time is appreciably shortened with Fireblok construction.

A Johns-Manville insulation expert will gladly explain the advantages and economies of using J-M Insulating Fire Brick and Fireblok for refractory linings or as back-up insulation behind other refractory protection. Write to Johns-Manville, Box 290, New York 16, N. Y. In Canada, write 199 Bay St., Toronto 1, Ontario.

Properties	Types of Insulating Fire Brick and Fireblok					
	JM-3000	JM-28	JM-26	JM-23	JM-20	JM-1620
Temperature limit	†3000F	†2800F	†2600F	†2300F	†2000F	‡2000F †1600F
Density, lb per cu ft	63–67	58	48	42	35	29
Transverse strength, psi	200	120	125	120	80	60
Cold crushing strength, psi	40	150	190	170	115	70
Linear shrinkage, percent	*0.8 at 3000F	4.0 at 2800F	1.0 at 2600F	0.3 at 2300F	0.0 at 2000F	0.0 at 2000F
Reversible thermal expansion, percent	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F
Conductivity (Btu in. per sq ft per F per hr at following mean temperatures)						
500F	3.10	2.00	1.92	1.51	0.97	0.77
1000F	3.20	2.50	2.22	1.91	1.22	1.02
1500F	3.35	3.00	2.52	2.31	1.47	1.27
2000F	3.60	3.50	2.82	2.70	1.72	----

*24-hr Simulative Service Panel Test; all others 24 hr soaking period. †Back-up or exposed. ‡Back-up only.

JOHNS MANVILLE JM PRODUCTS

Johns-Manville *first in* **INSULATIONS**

Straight-chromium grades of Stainless Steel *now free of CMP controls*

EFFECTIVE JANUARY 28, 1952, the NPA has removed the straight-chromium grades of Stainless Steel from CMP controls. This action, taken in Directive 9 to CMP Regulation 1, makes it no longer necessary for purchasers of these grades to obtain CMP tickets for their requirements.

United States Steel produces three basic grades of straight-chromium Stainless Steel. These are U·S·S 12 (AISI Type 410), U·S·S 17 (Type 430) and U·S·S 27 (Type 446). Also on the list of available grades are three modifications of U·S·S 12, including U·S·S 12Al (Type 405), U·S·S 12 Turbine (Type 403) and U·S·S 12FM (Type 416).

These grades of U·S·S Stainless Steel are being used successfully today in a wide variety of applications, including wall and roof panels, coal preparation equipment, machinery, refinery equipment, household articles, appliances, and automotive and railroad equipment.

These Stainless Steels combine durability, long life and corrosion resistance. From the standpoints of both fabrication and end use, they can serve in many places as effective alternates for scarce nickel-bearing grades. Our Stainless engineers will assist you in examining these straight-chromium grades for suitability to your operations.

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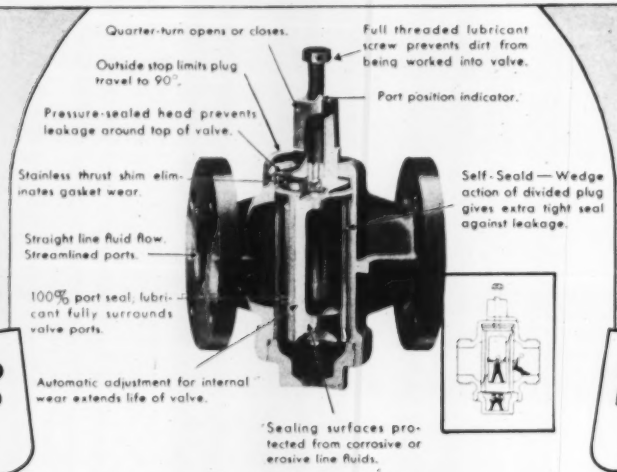
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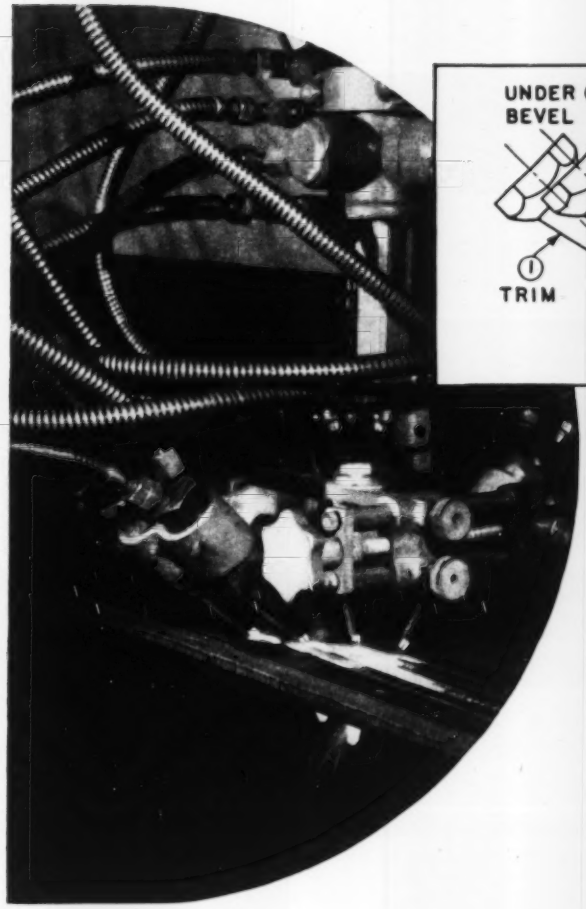

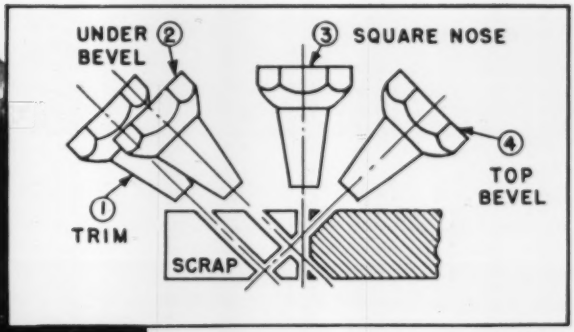

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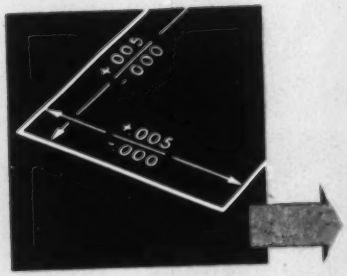
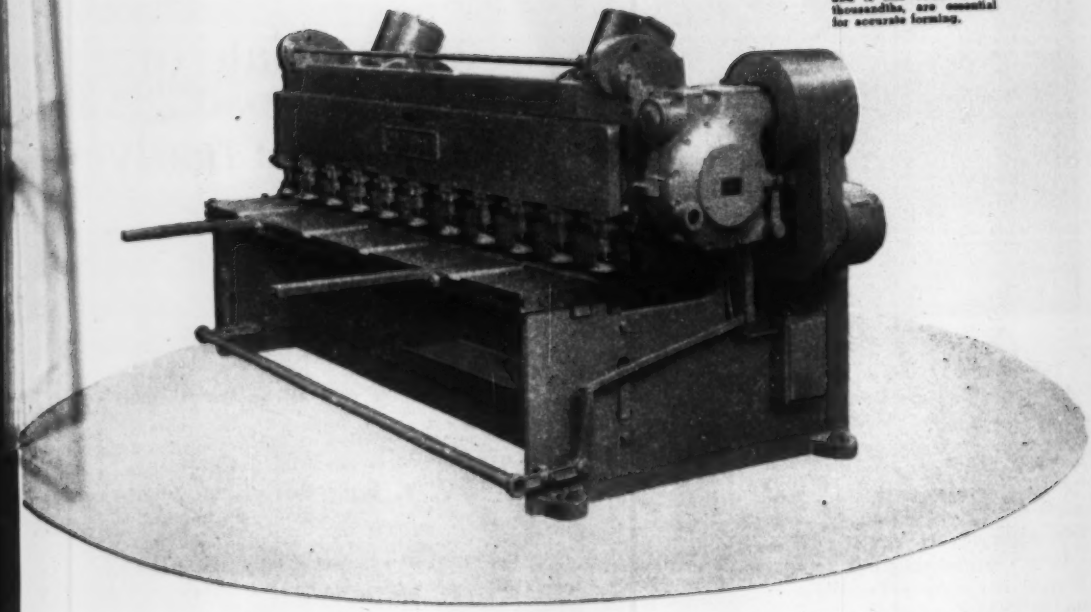
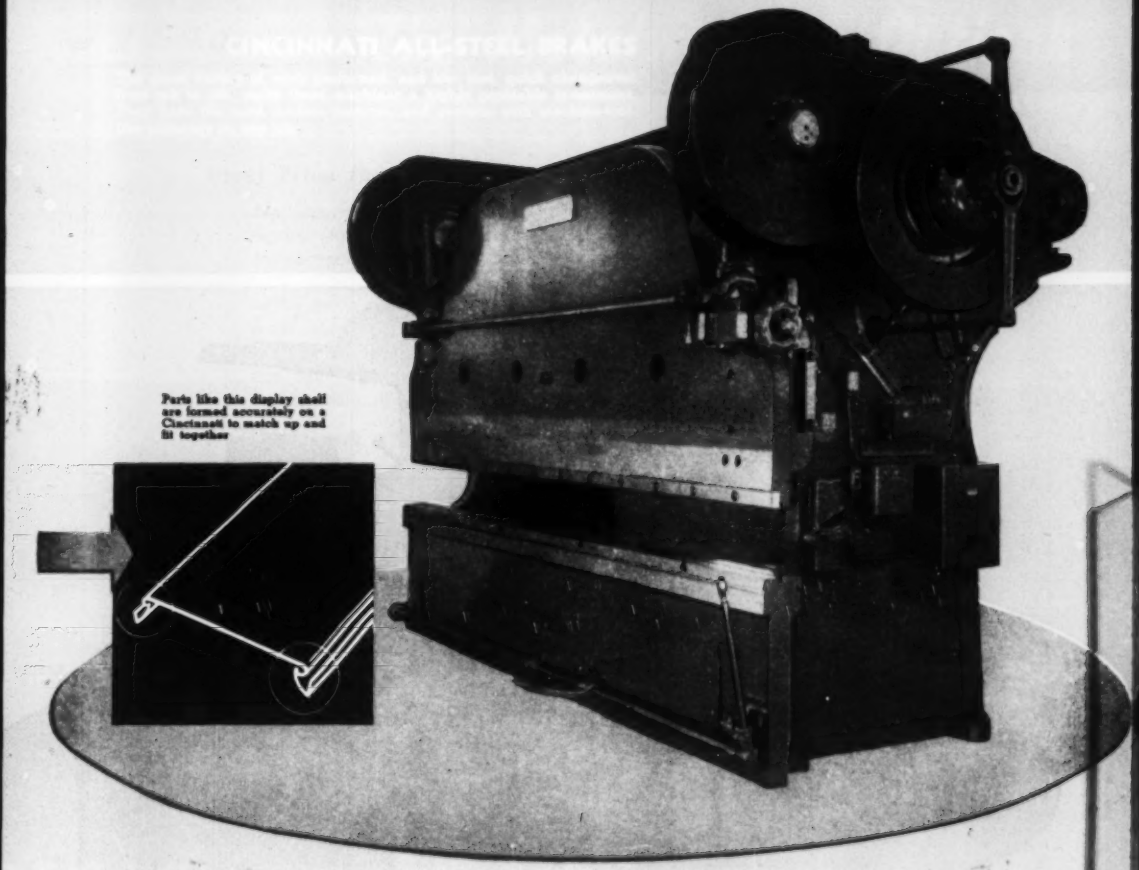


Cincinnati blanks, square and to size within a few thousandths, are essential for accurate forming.





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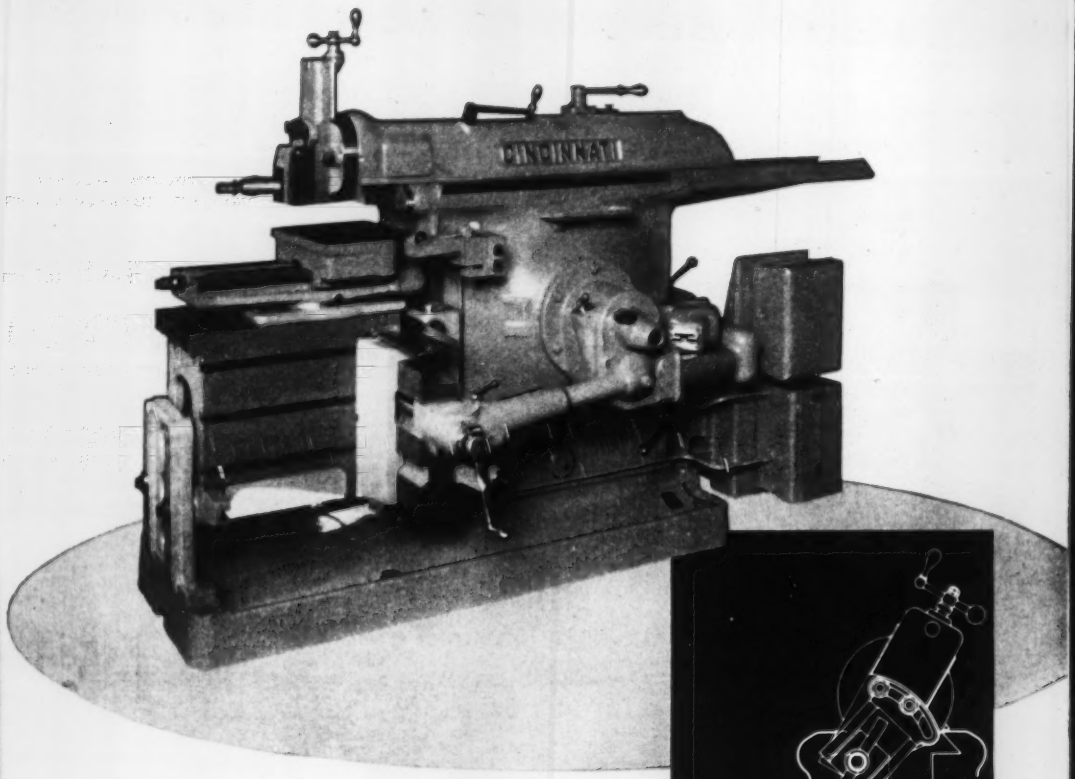

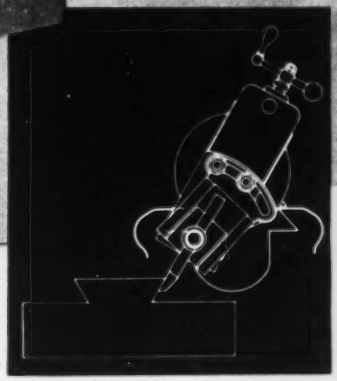

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The Metalworking Outlook

February 18, 1952

Steel Price Formula Coming

No Capehart adjustment of steel prices under the present voluntary agreement will be undertaken. The reason: The voluntary price agreement will probably soon be replaced by a special steel regulation that's expected to contain provisions permitting steel producers to figure in costs so they'll be able to boost prices to offset, partly at least, the anticipated wage increases. The General Steel Products Industry Advisory Committee has already considered one draft of the new regulation, and a second draft is in the works which will incorporate some of the changes the group suggested.

Another Look at Labor Costs

Watch for renewed interest in motion-time systems now that labor costs seem certain to rise once again. Today about 90 per cent of the cost of all products is labor expense, and that ratio will rise slightly after this next wage round.

Reverberations in Machine Tools

Repercussions mount as a result of the government cancellation of Fisher Body's $69 million subcontract to produce Builard turret lathes. In commenting on the move, Clay Bedford, special assistant to the Secretary of Defense, says, "I consider it one of the smartest things the Defense Department has done." He claims that the contract stirred up machine tool builders so they were spurred to develop new machines and find ways to boost production and pare costs. He believes the Fisher "contract cancellation charges will be more than offset by subsequent savings." The Bedford argument is debatable. One new machine tool, the T-shaped lathe, the development of which influenced the Fisher cancellation, was in the works long before the Fisher contract was granted.

Extrusion for Guns

An evolution is going on in gun manufacture. Big parts can now be extruded where they were once forged. That means technological changes all along the line. Heat treating is one of the problems, and it is resulting in changes in industrial furnace equipment for that particular operation.

Wider Ramifications

The comptroller general of the U.S. has ruled—partly as a means to legalize the granting of defense contracts to "distressed areas" such as Detroit—that defense contracts are not required to be awarded to the lowest bidder where advertising procedures are used. The ruling may have ramifications far wider than just aid to hard-pressed regions. It could permit unsuccessful bidders in nondistress areas to match the low bid and share in some of the larger contracts. It could be a boon to small business.

SDPA: Growing Fast

The Small Defense Plants Administration is emerging as one of the

Production-Engineering News—p. 93 The Market Outlook—p. 169

more powerful defense agencies. It has won a jurisdiction fight with NPA and now has the principal functions of NPA's Office of Small Business. One reason for SDPA's gains: It has the support of the influential House Small Business Committee.

More Research

Total research and development expenditures in the U.S. during 1952 will be $2930 million, 13 per cent greater than in 1951, predicts the Defense Department's Research & Development Board. Some $1640 million of that sum will come from government. Use of funds by type of organization: $1820 million by industry, $280 million by universities, $830 million by government. Sales of scientific apparatus, always a good indication of research activities, last year exceeded the 1950 level by 40 per cent . . . The House Armed Services Committee will soon investigate the Research & Development Board. The agency spends $90 million a year, and the committee is dissatisfied with the results.

Deferred Payments

Take a look at deferred-payment plans for your executives. With income taxes taking so much of an official's pay, a solution to some salary problems may be to pay in the future an amount that might otherwise be paid out in current salary. The funds allotted to the executive may be paid in instalments over a period of years after his services have ended; take the form of a supplemental pension payable for life; or be a contract to employ him as a consultant after retirement.

Straws in the Wind

A General Motors contract to build propellers for the Fairchild C-119 has been cut back . . . NPA has renewed until Aug. 11, 1952, the certificate of necessity authorizing construction of a New England steel mill; it's the final extension permitted . . . Harvey Machine Co. Inc. has received a certificate of necessity involving its proposed $65 million investment for production of aluminum in Montana . . . W. Stuart Symington has quit the RFC; Leo Nielson becomes acting administrator . . . Portsmouth Division, Detroit Steel Corp., will have a new strip mill operating within four months.

What Industry Is Doing

The tool stockpile idea meets mixed industry reaction (p. 65) . . . Decontrol talk mounts in Washington (p. 65) . . . The scrap situation is a little easier (p. 67) . . . We may have plenty of structural steel by the second half (p. 67) . . . The steel scaffolding industry has grown to a $10 million industry in less than 20 years (p. 68) . . . Troubles in tanks can be remedied, says the Army Ordnance Corps (p. 71) . . . The West German government will set a new course for the German steel industry (p. 75) . . . A proposal, resembling but not the same as the input-output plan, is being considered as a way to figure CMP requirements, even as a means of decontrol (p. 76).

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While it is true there are several builders of hack sawing machines and many builders of band sawing machines, only MARVEL builds *BOTH* hack saws and band saws. The fact is that MARVEL manufactures 35 models of 10 basic types of metal sawing machines which include the world's fastest automatic production saw, the world's largest giant hydraulic hack saws, the world's most versatile band saw and the most widely used small shop saws.

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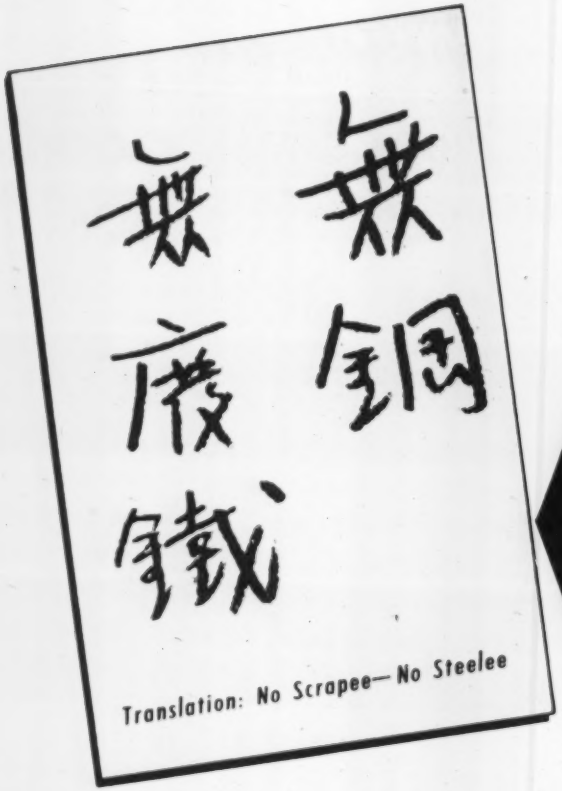

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Idle Resources

Ever since the defense program got under way, some Washington spokesmen have gone to great pains to define its objective. Defense Mobilizer Charles E. Wilson has stated repeatedly that the initial goal is to provide capacity for production of military goods on a grand scale. Actual production of tanks, planes, shells and other items in the volume required to implement all-out war is not contemplated. The program is chiefly one of preparedness.

In spite of this emphasis, numerous government officials persist in believing that the defense program will take up most of the slack that results from curtailment of civilian production. Almost every day somebody says that as soon as the mobilization program advances beyond the tool-up stage, it will absorb most of the unemployed. This type of optimism does not take into account the real character of the defense program.

Frank Rising, general manager of the Automotive Parts Manufacturers' Association, stated the case realistically in a recent memorandum to members of his association. He said that the "defense program doesn't translate into mass production or mass employment. It is to a considerable extent an engineering job, not a production job. It calls for facilities and stockpiles. Facilities to make tanks, not the tanks themselves. Facilities for everything, but not the everything. Not yet—unless we go to war. There isn't much mass production in getting ready."

If this is sound reasoning—and in general it rings true—there are important questions for Washington to answer. One is whether or not too much emphasis has been placed upon facilities and not enough on production of some urgent items, such as planes to give us air superiority over Korea.

Secondly, if the defense program, even when rolling in high gear, isn't going to take up the slack in mass production or in employment, why not permit the slack to be utilized for essential civilian output? The apparent shortages of critical materials, which prompted the drastic cutbacks now effective, are easing.

We have ample demand for all of our resources. We shouldn't permit red tape to keep them idle.

E. C. Shaner

EDITOR-IN-CHIEF

MOTHS TO THE FLAME: One wonders who was the master-mind that contrived to schedule Whittaker Chambers on National Broadcasting Co. stations immediately following United States Steel's presentation of the Theater Guild's play "The Traitor" Sunday evening, Feb. 10.

Plot of the play revolves around a brilliant

American scientist who delivered atomic secrets to the Soviets. Confronted by evidence of his guilt by Navy Intelligence, his decent instincts prompt him to deliver to Navy officers a key Kremlin agent. High point of the play is his explanation that he turned traitor because he was fed up with the bungling of people to remedy ills by the slow action of democratic processes. He thought that by taking matters into his own hands, he might avert World War III.

This fictional explanation was followed by Whittaker Chambers' recital of a true life experience. He read his letter to his children explaining why he had become a communist and why he repudiated it to become a witness against Alger Hiss. He said that the essence of the appeal of communism is found in the simple statement of Karl Marx: "Philosophers have explained the world; it is necessary to change the world."

Mark well this word "change" and then remember the famous quatrain of the brilliant Persian mathematician Omar Khayyam: "Ah love! could you and I with Him conspire, to grasp this sorry scheme of things entire, would we not shatter it to bits—and then, remould it nearer to our heart's desire!"

Ponder the impatience of sensitive, brilliant minds with the slow progress of democracy and you can easily understand why some of our best intellects become moths attracted to the bright, deathly flame of communism.

* * *

CURSE OF "LITTLE BITS": "We cannot live with a government of laws that are just a little bit unconstitutional. We cannot live with government officials who are just a little bit dishonest. We have been victimized by governmental strategy of a little bit of socialism at a time for 20 years. Now we have a whole lot of socialism." From an address by Charles M. White, president of Republic Steel Corp., before Pittsburgh Traffic Club.

* * *

POWER OF A SYMBOL: Last week in the pageantry which attended the rites and funeral of King George VI, the world witnessed the deep respect of the British people for the symbol of the British crown. That respect stayed the hand of the opposition in Parliament which was on the point of attempting to censure Prime Minister Churchill for commitments he allegedly made during his recent visit to America. Will that same respect, coupled with devotion to the new Queen, continue to quiet the voices of discontent until the Churchill policies gain momentum? Britain has fared well during the reigns of her queens.

* * *

A THREAT TO FREEDOM: Joseph H. Ball, former United States senator from Minnesota, in the Feb. 11 issue of "The Freeman," warns that the Wage Stabilization Board is about ready to recommend adoption of the union shop—requiring compulsory union membership—as a means of helping to settle the disputes before WSB involving 650,000 steel employees, 10,000 employees of Douglas Aircraft and 25,000 of Boeing Airplane.

For the government to decree the union shop would be tantamount to depriving individuals of a cherished liberty. No man or woman should be compelled to join a union in order to earn a living. Even liberal-minded Franklin D. Roosevelt pledged in 1941 that the government will never compel nonunion miners to join a union by government decree. "That would be too much like the Hitler methods toward labor."

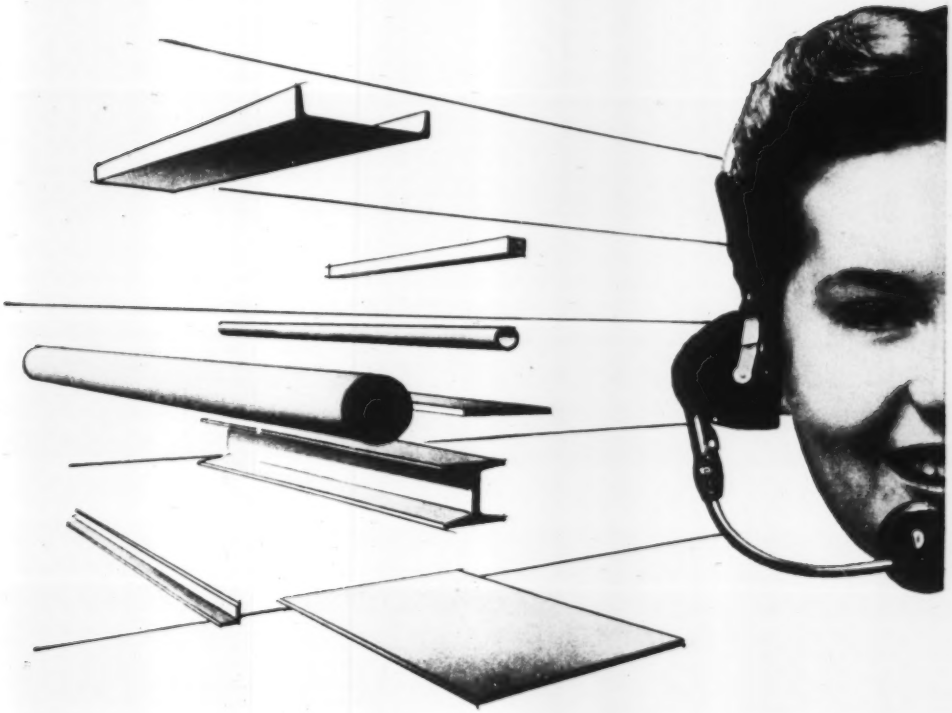
Urge your senators and representatives to protest against Hitlerite tactics in the present wage disputes!

* * *

BILLIONS ARE WASTED: A House Armed Services subcommittee is trying to find out why there is so much waste in military purchasing. Last week Rear Admiral Morton L. Ring, vice chairman of the Munitions Board, told members of the committee that military procurement officers are bedeviled by pressures from "at least 14 policies" of Congress and the administration.

He had in mind "those who would use military appropriations to solve social problems." Examples: Placing contracts in areas of unemployment, supporting "small" business and buying goods abroad to bolster the economies of foreign nations. These and other considerations certainly complicate the problems of military procurement but they do not explain why some items are purchased in quantities sufficient to meet the needs of the armed services for scores of years.

As a result of meddling by persons catering to pressure blocs and of buying far in excess of reasonable needs, the government is wasting billions of the taxpayers' money.



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Tools on Tap: Is Stockpile Answer?

Industry favors the idea of having up-to-date weapons producing equipment but thinks a sound depreciation reform program would work better than stockpiling

THE END SOUGHT may be sound, but not so the means proposed. That's industry's general reaction to the multi-billion dollar tool cache proposed by Clay Bedford, special assistant to the Secretary of Defense.

The plan is to sustain a reserve of weapons-producing equipment—machine tools, presses, heat-treating furnaces, necessary handling devices—well after the present defense program fades. Its purpose is insurance against unpreparedness in any future military crisis. The idea is a long way from reality and stockpiling wouldn't start until 1953, maybe later.

Alternate Means—One strong industry view: A healthier approach toward the same objective would be a sound depreciation reform program. If users of machine tools and related production equipment were allowed to depreciate equipment over shorter periods of time—or over any period they themselves selected—net effect would be to encourage continual modernization of plants and continual design improvements by builders.

Thus the tool producing industry could level out peaks and valleys in production and metalworking industry would be ready with latest equipment in event of emergency. The tools would have economic utility: They would be used, not standing idle. Fast amortization allowed today is, of course, only an emergency incentive to push plant modernization. Standard 20-year amortization, say users and producers, is both unrealistic and a deterrent to keeping up with production developments.

Theme Variation—The proposed program—now getting close attention from NPA and DPA—is another version of the stockpile plan put in effect after World War II. Then the Army, Navy, Air Force and General Services Administration saved, separately, the tools they wanted. In reality there were four separate pools. Under Mr. Bedford's plan, one central agency would do all buying.

The idea is to form a revolving, not static, pool of up-to-date standard tools. After a period of build-up (probably four years) and expenditures close to $3 billion, the buying pace would slacken and be limited to those new machines that would make equipment in the reserve obsolete.

Stumbling Blocks — Obstacles to the Pentagon plan are these: It would run into big money, congressional scrutiny would be close, and there would be no guarantee of continuity of operation—a vital factor in the plan's success.

Another fear is seen in allowing government control of such a vast array of production equipment. Indirect effect might be to throw historical distribution patterns into turmoil. Danger in government dumping is another worry.

Clairvoyance — Another objection is the clairvoyance necessary in determining what weapons would be used in another war. Weapons and machinery to produce them can change overnight, says one builder, pointing to the wholesale cancellation of orders by the Air Force.

Despite procedural problems, the substantive idea seems sound to many in industry. A typical reaction to the plan: "Even though it might be planning too far into the future, some kind of a plan to have machinery immediately available is sound dollars and cents security."

Decontrol Talk Mounts

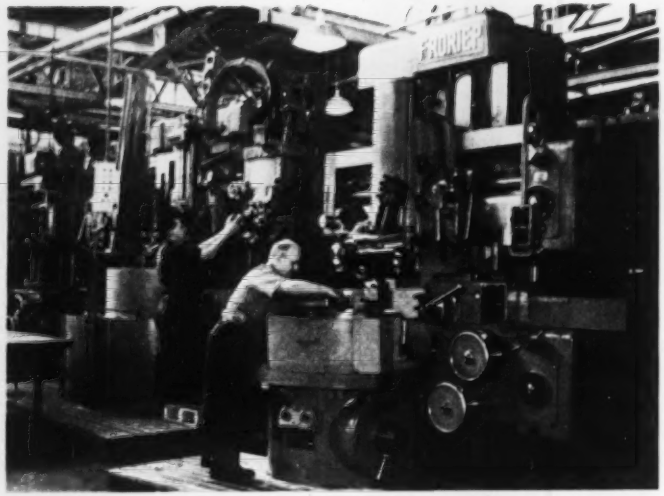
Arnall promises "study" on prices. Fowler offers some hope on materials

"DECONTROL" is a word heard frequently in Washington these days, but it's still mostly talk.

Ellis Arnall, former governor of Georgia, has won Senate Banking Committee approval of his appointment as OPS director to succeed Michael DiSalle on the ground that he will push studies looking toward price decontrol.

Hedge—But Mr. Arnall, whose approval as OPS boss by the full Senate is virtually assured, cautioned "that we must not hasten headlong into decontrol" of prices. "When the facts are such that a segment of the economy can be decontrolled," he added, "of course, that should be done." Complicating

MACHINERY FOR A READY RESERVE
. . . the objective is sound, the means debatable



PRATT & WHITNEY BUYS GERMAN LATHES: A German-made Froriep 39-inch vertical turret lathe, first of 74 machine tools purchased from European firms in 1951, is in operation at Pratt & Whitney Aircraft, East Hartford, Conn. With a five-way tool-holding turret, the machine can bore, turn, and face large circular parts with feed rates from .005 to .354 inches per revolution of the table. P&WA obtained special approval from the U. S. government for the foreign purchase, totaling more than 1.7 million, on grounds of earlier promised delivery

the situation are strong union protests at price decontrols.

Further decontrol of materials is also still in the talking stage. NPA admits that it is considering decontrol of tin plate wasters, cold-rolled strip, merchant pipe, merchant products generally, wire rope and mesh, fencing and fence posts, bale ties, nails and a few others (STEEL, Feb. 11, p. 53). But it says it can do nothing unless it has more assurance than it has yet received that a big change in the volume of military requirements is unlikely to materialize over the next two quarters. Also the decontrol plan probably would be limited perhaps an open-end type whereby a mill would be free to sell its remaining output only after accepting all proffered CMP allotments.

A Help—NPA Boss Henry Fowler does offer this solace: Future metal rations for makers of civilian goods are unlikely to go any lower than those already set for the second quarter. Because the defense buildup will be stretched over a longer period than originally planned, Mr. Fowler believes steel, copper and aluminum allotments will probably "touch bottom" in the second quarter.

NPA now is mailing out the last of its second-quarter allotments of controlled materials to manufacturers of consumer goods. Producers of stoves, toasters, office furniture and other "more essential" types of civilian goods will get, on the average, 50 per cent of the steel, 30 per cent of the copper and 30 per cent of the aluminum they used before Korea. In the current quarter, they're getting 50 per cent of the steel, 35 per cent of the copper and 35 per cent of the aluminum they used in the average of the first two quarters of 1950.

A Little Better—Producers of "less essential" civilian goods are getting a boost in the second quarter. Manufacturers of cigaret lighters, ash trays and similar items are awarded 50 per cent of the steel, 25 per cent of the copper and 25 per cent of the aluminum they used in an average pre-Korean quarter. That compares with allotments this quarter of 50 per cent steel, 10 per cent copper and 20 per cent aluminum.

A factor that may spur decontrol action by NPA is the declining volume of steel required by spot production directives. Those directives are issued when procurement agencies need immediate deliveries of scarce items to bale them out of trouble. In the middle of January such directives totaled about 40,000 tons of steel a week. For the week of Feb. 4, the last period for which figures are available, the total dropped to about 8000 tons.

Fruit of Expansion: New Steel Output Record

RESULTS from the steel industry's expansion program are becoming increasingly evident. In January, the industry turned out more steel than ever before in a month—9,120,000 net tons for ingots and castings.

This amount, the American Iron & Steel Institute points out, is almost 4000 tons greater than the previous record which the steel industry set in October, 1951.

The January output was at a rate of 99.1 per cent of total capacity.

Since the industry's capacity was increased as of Jan. 1, 1952, the January percentage rate of production was lower than it would have been for the same amount of output based on the previous, or lower, capacity.

	OPEN-HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	No. of weeks in mos.
1952	Net tons	% of capacity	Net tons	% of capacity	Net tons	% of capacity	Net tons	% of capacity		
†January	8,086,000	100.5	407,000	89.3	627,000	89.9	9,120,000	99.1	2,059,000	4.43
1951										
January	7,844,982	101.4	431,725	90.4	566,460	88.3	8,843,167	99.9	1,996,200	4.43
*December	7,884,146	102.1	396,831	83.3	604,152	94.3	8,885,129	100.6	2,010,210	4.42
*4th Quar.	23,660,342	103.1	1,266,913	89.4	1,867,659	98.1	26,794,914	102.0	2,039,187	13.14
*2nd 6 mo.	46,710,264	101.8	2,520,060	89.0	3,632,326	95.4	52,862,650	100.7	2,012,282	26.27
†Total	93,146,625	102.3	4,890,946	87.0	7,096,982	93.9	105,134,553	100.9	2,016,390	52.14

Note—The percentages of capacity operated in 1952 are calculated on weekly capacities of 1,816,637 net tons open-hearth, 102,926 net tons bessemer and 157,477 net tons electric ingots and steel for castings, total 2,077,040 net tons, based on annual capacities as of Jan. 1, 1952, as follows: Open-hearth 94,973,780 net tons, bessemer 5,381,000 net tons, electric 8,232,890 net tons, total 108,587,670 net tons. The percentages of capacity operated in 1951 are calculated on weekly capacities of 1,746,337 net tons open-hearth, 107,806 net tons bessemer, 144,891 net tons electric ingots and steel for castings, total 1,999,034 net tons, based on annual capacities as of Jan. 1, 1951, as follows: Open-hearth 91,054,020 net tons, bessemer 5,621,000 net tons, electric 7,554,630 net tons, total 104,229,650 net tons.

† Preliminary figures, subject to revision. * Revised.

Stress on Structurals

Demand for shapes is off, and there's concern that controls may not be lifted soon enough

JUST how tight, really, is the demand-supply pinch in structural steel?

You can get many answers, depending on whom you talk with. But when the replies are analyzed this is the picture: The excess of demand over supply has definitely lessened, and in some circles there's concern as to whether there'll be an outlet for all of the supply in the second half of 1952. Much demand is now merely latent. Whether it will have a chance to express itself in time to prevent a heavy sag in structurals depends on the Washington controllers.

Among those concerned over the future is the Construction Industry Advisory Committee. It recommended to the National Production Authority that there be no further restriction on the use of structural steel in commercial building and that the use of foreign and salvage steel be permitted without specifically asking NPA.

The Structural Steel Fabricators Industry Advisory Committee urged NPA to institute advance planning immediately to avoid anticipated unemployment in its industry during the second and third quarters of this year. Committee members, reporting on the situation among structural steel fabricators in every section of the country, said their orders are decreasing, and that by the middle of the year the industry will be hard hit unless the firms are permitted more business.

Another group that's worried is the Steel Products Industry Advisory Committee. It notes that many builders and contractors and officials in charge of highway and bridge building have stopped making designs for proposed future construction because they have been told that no materials will be available.

Outlook — Washington controllers think there will be an increasing amount of government and defense construction work, but the thought in the trade is that this is not going to tighten the situation much. Some of the large fabricators of structurals believe that industrial expansion, such as is now receiving government approval through certificates of necessity, is going to show a definite downturn by summer. They also doubt that government military requirements in other directions will mount sufficiently to offset the increase in steel production.

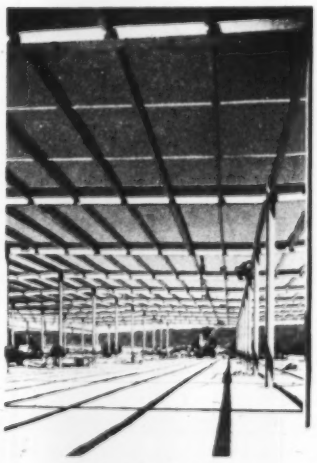
Competition among structural fabricators is increasingly sharp wherever there is any assurance that Washington will approve allotments of necessary steel. One large fabricator reports there is a scramble for this kind of work.

On Tap—In the Detroit area, many large industrial facilities have passed the steel erecting stage, but there is considerable work that could be turned on immediately if government restrictions were revised to permit acquisition of needed materials. Practically every large automaker has construction plans ready to go at a moment's notice.

Another job, the City-County Building in downtown Detroit, has been turned on and off ten times in the last year because of the steel situation.

In Washington, Defense Mobilizer Charles E. Wilson says the peak of plant expansion for rearmament is still a long way off and that there could be no substantial increase for maybe another year in allotments of materials for nondefense construction.

Ray of Hope—But there's a ray of hope that some of the deferred construction work will be permitted to feed into the trade just as soon as practicable: The National Production Authority told steel fabricating firms it would strive to bring their business back to "normal" as soon as possible—when defense building nears its peak. Procedures will be worked out, says NPA, to dole out larger quantities of materials for highways, schools and commercial projects.



STRUCTURAL STEEL
. . . demand over supply decreases

CHIP CRUSHER: With the aid of this 10,000 pounds an hour metal chip-crushing machine, General Electric Co. salvaged 153,000 gross tons of production-line and dormant steel scrap in 1951, an increase of about 31,000 gross tons over 1950

One Scrap Crisis Passes

The short term scrap crisis is almost over and industry can hitch up its belt for the longer pull

KEEP YOUR FINGERS crossed for the next two weeks. If the weather holds for that long, the crisis in the immediate scrap situation will be passed.

It's true, not all steel mill operators feel optimistic about the situation. They agree that one crisis will pass with the coming of better weather. But, they add, the 38 to 40 million tons of scrap needed by mills this year allows for no complacency.

Currently, scrap traders report, there is some backing up of cast iron grades of scrap, an easing of flow in electric furnace grades, but

open-hearth grades remain as tight as ever. Cast scrap is piling up because the lessened demand from foundries, due to cutbacks in orders from the automotive and construction industries, has not been made up by demand from open hearths. Mill operators say the real crisis in open-hearth and electric furnace grades will not be passed until inventories, now at 14-day levels, are built up toward more normal inventories of 60 days' supply.

Shakeproof Shakes Loose Scrap

Employees of Shakeproof, Inc., division of Illinois Tool Works, demonstrated how successful a scrap drive can be when carried out on an individual plant-wide basis. In less than a month they collected 212,576 pounds of scrap.

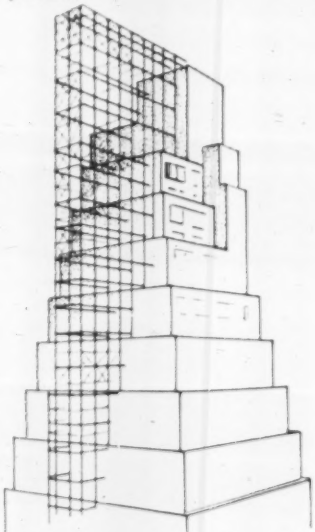
Gold Standard for Surfaces

A yardstick for surface finishes is now available to industry. For the first time, it will be possible to check finish roughness against an absolute standard, accurate to a millionth of an inch. Masters for the roughness measurers are pure gold blocks developed in a co-operative engineering project by General Motors Corp. and Chrysler Corp. Replicas, called "Caliblocks," having five roughness values will be manufactured by the F. A. Ringer Co., New York. Blocks with additional values will be offered later.

Here is how the replica specimens are used:

Every machined, ground, honed or lapped surface in production has a roughness value: the surface is marked by minute scratches forming "peaks and valleys." Holding these "peaks and valleys" within certain standard limits is a key problem in industrial precision work. Up to now, each company sets up its own surface finishing standards. Variations in surface roughness often made it difficult, if not impossible, to match parts from different shops in precision production. The new Precision Reference Specimens of Surface Roughness provide constant roughness values.

Having the blocks, of course, is not enough. Instruments must compare the work surface with the standard roughness replicas. Negotiations are currently going on with leading manufacturers of surface-roughness measuring instruments to include these reference specimens as calibrators. GM will soon announce a new machine, the Surfagage, for making the comparison.



From the Ground Up

Makers of steel scaffolding have created a $10 million industry in less than 20 years

MANUFACTURERS of scaffolding, who make a business of going up, see sales rising even higher than some of their tallest jobs.

From practically nothing in the early 1930s, sales of steel scaffolding (the most important type) rose to about $3 million just before World War II, soared to about $10 million last year and should reach new heights in 1952, estimates D. P. Closser, assistant sales manager of Safway Steel Products Inc., Milwaukee, one of the major producers.

Breakdown—Some 13 companies account for most of the volume in steel scaffolding. Two companies have brought out aluminum designs, but developments there are recent and the sales volume is not yet substantial. Just one company is known to make prefabricated wooden units and total sales in all wooden scaffolding is only about $1 million annually.

Patent Scaffolding Co., New York, is one of the firms making the aluminum product, used primarily in maintenance where its lightness is an asset even though it costs about 12 percent more than steel. Patent also makes steel units. Today, some 70 per cent of that type goes for construction, the rest for maintenance, says R. L. Carbeau, assistant to the president, Universal Mfg. Corp., Zelienople, Pa. Despite the current situation, many manufacturers think the largest potential market is in maintenance because of the big and high plants being built today. A promising outlet for both steel and aluminum scaffolding is as work stands in the aircraft industry. That market was active in World War II, may soon be again.

Troubles — Materials procurement for steel scaffolding makers is a problem, especially for those who have much of their output unrated. Some makers, such as Detroit Steel Scaffold Manufacturers, use square tubing, unusually difficult to obtain. Most steel scaffolding is of rail carbon tubing, a little easier to find. The main variety of steel scaffolding is the tube and clamp type, which can be easily and quickly mounted or dismantled. Another kind is the frame type. Rigid frames about five feet wide and ranging from three to ten feet high are shop-fabricated and then bolted together.

More Time To File

Defense contractors with contracts subject to the Renegotiation Act of 1951 will get more time to file financial statements. All contractors with fiscal years ending on or before Dec. 31, 1951, have now until May 1, 1952, to file Form 1 of the Standard Form of Contractors' Report. The former date was Mar. 1 for contractors with fiscal years ending before Dec. 1 and Apr. 1 for those with fiscal years ending with the calendar year.

The Renegotiation Act of 1951 requires all defense contractors and subcontractors having renegotiable contracts to file financial statements with the board as to

the total amounts received at the end of their fiscal years.

Inland Steel Products Expands

Inland Steel Products Co., Milwaukee, Wis., producers of the Milcor line of steel building products, is celebrating its fiftieth anniversary by undergoing a $2.5 million expansion which will add 40 per cent more floor space to the present facilities. The added space is expected to permit addition of new product lines. It will be completed this year.

Bethlehem Sinks Iron Ore Mine

Bethlehem Steel Co. is spending $65 million developing iron ore properties around Morgantown, Pa. At present one shaft, about 20 feet in diameter, is down some five or six hundred feet. Rich ore is expected to be found at 3000 feet and full production is hoped for in 1954.

The vein of ore which Bethlehem plans to exploit at Morgantown extends from Boyerstown, Pa. to Harrisburg, Pa., and lies about half a mile beneath the surface. "Prospecting" was assisted by aerial flights over the area and the use of Geiger counters. Most violent oscillations came over Cornwall, Pa., where mining operations have been in production for some time, and over Morgantown.

The Pot Boils

Labor, steamed up by the steel case, may pull many small strikes, few big ones, this spring

THE LABOR POT is nearing a high boil which will continue—with occasional strike eruptions—for the next three or four months.

The steel wage case is not expected to boil over into a walkout by steelworkers but the heat from the controversy may stimulate other explosions—mostly local—from March until June.

More than Half—The majority of all union contracts can be reopened this spring. The decision in the steel case will affect them all, whether they involve meat packing or metalworking, because the government's wage formula will be severely "stretched" by the decision in steel. It's possible that the stretch will be so severe that a blanket order will come out from the Wage Stabilization Board permitting general adjustments. The federal policy over the next few months will be to bring pressure to avoid all major strikes, but nature will take its course in most local affairs.

The companies which will feel the effects of the steel decision the quickest will be those fabricating firms which don't produce basic steel but which nevertheless have contracts with United Steelworkers of America. In the past USA has usually imposed the latest steel formula on them, although it has agreed to modifications to fit local conditions. The next group of firms to be hit by the steel decision will be that large segment of metalworking which is unorganized or represented by independent unions. Many of those companies have long had unwritten agreements with their workers to follow the steel pattern.

Weapon—One argument used by steel companies last week in their hearings before the WSB panel was payroll figures for 1951. Average hourly wage of steelworkers rose from $1.978 in November to $1.987 in December, highest ever attained, says American Iron & Steel Institute. For the full year a new annual record of $1.945 per hour was set in 1951. That average is 11 per cent above the $1.746 average for 1950, 56 per cent above 1945 and 129 per cent over 1940.

Payroll rose nearly 21 per cent in 1951 to $2,881,170,000—about $500 million over the 1950 total. December payroll was $246,726,000, up $4.6 million from November and $11.4 million from December, 1950. The 675,100 wage earners employed in December worked an average of 39 hours per week that month, 1.2 hours under the year's average.

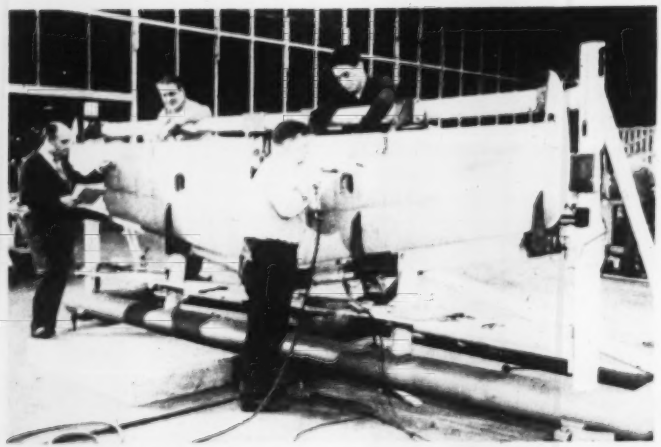
Sharon Steel to Roll Titanium

After successfully rolling titanium alloy, Sharon Steel Corp. may make that activity a regular part of its operations. The metal was rolled on one of Sharon's regular hot mills used for producing steel strip. It contains small quantities of aluminum and chromium as well as titanium. The experimental program was carried out by the Mallory-Sharon Titanium Corp. at Sharon's Roemer Works, Farrell, Pa.

PAD Sums Up for Second Quarter

Allocations of pipe for oil and gas lines total 588,081 tons in the second quarter, 1952, says the Petroleum Administration for Defense. Of the total, 307,500 tons is marked for natural gas projects and 280,581 tons will go into crude oil and major product lines.

LONDON BRIDGES: An Illinois Central Railroad locomotive scoots under a section of one of three 20-inch pipelines being laid across the Mississippi river by the Texas Illinois Natural Gas Pipeline Co. of America. Connecting Chicago with Texas gas fields, the lines will span the 300-foot wide river at Grand Tower, Ill.



GOODYEAR STABILIZES THUNDERJET: A horizontal stabilizer for the Air Force F-84 Thunderjet is undergoing final production operations and inspection at the Goodyear Aircraft Corp., Akron. Goodyear soon will produce the stabilizers in quantity under a subcontract from Republic Aviation Corp., Farmingdale, Long Island, N. Y. The complete unit is ready to be secured to the plane

Defense Procurement Well Is Far from Dry

DURING the first half of fiscal 1952 (July-December, 1951) the Defense Department obligated $18 billion for procurement of major equipment, supplies, military construction, expansion of production facilities and military assistance to foreign countries.

Of this total, hard goods account for $15.2 billion, soft goods for $1.9 billion and construction $0.9 billion. Procurement for the Mutual Security Assistance Program accounts for $0.8 billion of the $15.2 billion obligated for hard goods.

A total of $3.4 billion has been allocated as of Dec. 31, 1951, to the Defense Department of the $5.8 billion provided by Congress for military assistance in fiscal 1952. Including this $3.4 billion, funds available for obligation during fiscal 1952 amount to $66.9 billion, of which $4.2 billion represents carry-over from 1951.

Since the attack on Korea, $85.6 billion in obligational authority has been given to the Defense Department, $69.8 billion for hard goods, $8 billion for soft goods and $7.8 billion for construction. And there seems to be more where that came from.

See the accompanying table for selected metalworking contracts awarded by the government in excess of $250,000 in value.

PRODUCT	CONTRACTOR
Planers	G. A. Gray Co., Cincinnati
Presses	Hydraulic Press Mfg. Co., Mt. Gilead, O.
	E. W. Bliss Co., Canton, O.
Generator Sets	United States Motor Corp., Oshkosh, Wis.
	International Ferment Machinery Co. Inc., Ramapo, N. Y.
Signal Generators	Hewlett-Packard Co., Palo Alto, Calif.
Oscilloscopes	Lavoie Laboratories Inc., Morganville, N. J.
Radiosonde Receptors	Fries Instrument Div., Bendix Aviation Corp., Baltimore
Receiver-Transmitters	Lewyt Corp., Brooklyn, N. Y.
	Magnavox Co., Ft. Wayne, Ind.
	Crosley Div., Avco Mfg. Corp., Cincinnati
Test Equipment	Munston Mfg. & Service Inc., Islip, L. I., N. Y.
Test Sets	Connecticut Telephone & Electric Co., Meriden, Conn.
Electron Tubes	Eitel-McCullough Inc., San Bruno, Calif.
Frequency Shift Exciter	Hallicrafters Co., Chicago
Mountings, MT-709	Parkchester Machine Corp., New York
Tool Equipment	Specialty Assembling & Packing Co., Brooklyn, N. Y.
Aircraft (2 contracts)	Boeing Airplane Co., Wichita, Kan.
	North American Aviation Inc., Los Angeles
Wheel & Brake Assemblies	Bendix Products Div., Bendix Aviation Corp., South Bend, Ind.
Controls	Lear Inc., Grand Rapids, Mich.
Parachute Flares	Nesco Inc., Center Line, Mich.
Bomb Fuses	Kilgore Inc., Westerville, O.
	Easy Washing Machine Corp., Syracuse, N. Y.
Cartridge Cases	Murray-Ohio Mfg. Co., Cleveland
	Ekco Products Co., Massillon, O.
	Mission Appliance Corp., Hawthorne, Calif.
Boosters	Robertshaw-Thermostat Div., Robertshaw-Fulton Controls Co., Youngwood, Pa.
Dummy Nose Plugs	Inland Equipment Co., Nashville, Tenn.
Spherical Floats	Gary Steel Products Corp., Norfolk, Va.
	National Steel Construction Co., Seattle
Button Stringers	Modern Welding Co. Inc., Owensboro, Ky.
Button Ramps	Pittsburgh-Des Moines Steel Co., Pittsburgh
Transom Clamps	Birmingham Fabricating Co., Birmingham, Ala.
Wire Rope Clips	Midland Industries Inc., Cedar Rapids, Iowa
Maintenance Parts	Sundstrand Machine Tool Co., Rockford, Ill.
Motor Vehicle Parts	McCord Corp., Detroit

Shellmakers Set Up Committee

A carbide cutting tool subcommittee of the American Ordnance Association's shell committee is operating as a clearing house for carbide tooling data and problems arising in shell manufacturing. A list of all available technical data on application of carbides in shell manufacture has been prepared, and the subcommittee is reviewing other literature as it becomes available.

It also provides aid to plant managers who wish to organize training programs relating to the application of carbides in shell production.

Peerless Has Shell Contract

Peerless of America Inc., Chicago, has a multi-million dollar contract to make shells of undisclosed description except that it is the first shell of its type to be manufactured in the Chicago area. In normal times Peerless makes commercial refrigeration and air conditioning equipment on a small business basis.

Camera Works for Engineers

A new bore-hole camera for discovering flaws in all types of bedrock has been developed by Engineering Research Associates, St. Paul, Minn., for the Army Corps of Engineers.

The camera takes 360-degree photographs of a three-inch diameter bore hole and is built so that either dry holes or water holes may be photographed. By using a special projector, the picture can be viewed in undistorted form on a cylindrical screen.

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Materials Order

ELECTRIC UTILITIES—Amendment of Feb. 7, 1952, of NPA Order M-50 permits electric utilities to place orders for allotments of controlled materials for minor requirements for the second quarter of 1952 and advance allotments of these materials for minor requirements in the following three quarters.

Controlled Materials Plan

REPAIRMEN—Amendment of Feb. 7, 1952, of CMP Regulation 7 clarifies repairmen's use of the RE allotment symbol on delivery orders for copper wire mill products.

Price Regulations

REFRACTORY PRODUCTS—Ceiling Price Regulation 125, issued Feb. 7, 1952, is a tailored dollars-and-cents ceiling price regulation covering manufacturers of a wide range of refractory products. The regulation was effective Feb. 12, 1952.

SPRINGS, STAMPINGS—Amendment 1 of Ceiling Price Regulation 119 permits makers of mechanical precision springs, metal stampings and screw machine products covered by CPR 119 to use ceiling prices established under the machinery manufacturers' price regulation, CPR 30. Also, makers of these products who previously elected to use ceilings established under the General Ceiling Price Regulation rather than those under CPR 30 are permitted to continue to use GCPR ceilings until Apr. 1, 1952, at which time they must compute ceilings either under CPR 30 or under CPR 119. The amendment, issued Feb. 11, 1952, was effective Feb. 16.

QUITE A PUZZLE: Two executives of U. S. Steel, Harry M. Francis, right, vice president of sales, and John Graham, general manager of sales, seem perplexed as they scan through NPA and OPS regulations and orders in preparation for a panel discussion at the annual sales meeting of U. S. Steel's American Steel & Wire Division in Chicago. "What a job," says Mr. Francis

Tank Troubles

Ordnance says bugs are inevitable but remediable under speedup system it adopted

CRITICISM of the Army Ordnance Corps for putting land tanks into production before all bugs had been removed is subsiding.

When the Army field forces called for tanks for earliest possible delivery in Korea, Ordnance responded by abandoning the conventional method of getting a new model into production after two or three years of development, testing and tooling. Instead, it undertook production of the tanks as they existed on the drawing board—leaving the ironing out of production and engineering wrinkles until such problems arose.

Time Saver — That approach, Ordnance says, cost more in dollars, but it brought tanks off the production lines a full year sooner than would have been the case in normal routine. Nobody will know exactly how many American lives were saved by this hurry-up but the Army is satisfied it paid off.

General J. Lawton Collins, Army chief of staff, thinks that none of the T-41 tanks now in stock at the Cleveland tank plant and at Ordnance establishments will be lost because of present defects. Many of these tanks, made at the start of the program, have turret troubles which can be cured. All of them can be refitted so that their guns can be trained on target in 5 seconds if necessary.

The How of It—Ordnance has worked out two systems for incorporating engineering improvements in the tanks without interrupting production schedules. The first is called the "engineering change block system," in which the tanks are scheduled for production in blocks or groups—possibly 100 in a run. During the production of that block, and as a result of tests of the tanks as they come off the line, the need for certain changes in design or in production methods is established; those changes then are incorporated in the production of the next block of tanks—and those in the preceding block are provided with the changes—at least to the number of tanks required for immediate shipment to the Army field forces. The second system, used at the Detroit Tank Arsenal is termed the "forecast and accomplishment system." In that, changes are forecast in the production line based on many factors among which are availability of new parts in sufficient quantity to maintain production and stocks of old parts on hand.

In both systems, all tanks are provided with all the changes—so that in the end the tanks first off a line correspond with the ones that come off last.

Work Stoppage Unexplained

Hayes Mfg. Corp., Grand Rapids, Mich., was notified to stop work immediately on a $2 million torpedo parts subcontract from General Electric Corp. Work at Hayes began in July and was about one-third finished. No reason was announced for the stop order.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

Welded aluminum tubing could replace drawn seamless in some applications if dependable method of testing welded joints for minor defects is found

NAVY Bureau of Ordnance is intensifying its search for foolproof, nondestructive, economical testing methods that can be counted on to show up any and all defects in welded joints. Reason: Sharply increased demand for aluminum tubing.

Welded aluminum tubing is being used in cartridge case tanks and other applications where the physical requirements are not too high. But for such important applications as rocket motors, where the pressures are high and where severe shocks and stresses must be sustained, drawn seamless aluminum is still used.

Limited—Until satisfactory testing methods are available, supply of aluminum tubing for such uses will be limited by capacity for seamless aluminum tubing production.

BuOrd has a number of contractors at work on the problem of developing a testing technique that will dependably reject welded tubes with minor defects that could cause failure in field service.

Generating a Market . . .

A spurt in demand for small electric generators should result from the recommendation of the Agricultural Research Administration that farmers install such units to assure themselves of a power supply when normal service is interrupted.

A unit that can generate at least 3000 watts—one that can operate a milking machine, furnace, freezer, water system and a normal number of lamps—is about the right size in most cases. Most economical type, ARA engineers say, is a tractor-operated unit, that doesn't require a separate gasoline motor.

How to End It All . . .

"Termination of Contracts" is the title of the newly issued Section VIII of the Armed Services Procurement Regulation. For the first time since 1948, when the Contract Settlement Act of 1944 became inapplicable to military contracts, uniform policies and procedures now will be applied to terminated contracts by the Army, Navy and Air Force. They will become effective as soon as adequate distribution has been obtained.

Copies of the new "Section VIII Termination of Contracts" can be obtained for 50 cents from the Superintendent of Documents, Government Printing Office, Washington 25.

Small Business: Big Business . . .

Regional offices have already been established by the Small Defense Plants Administration at Boston, Minneapolis, New York, Chicago, Seattle and Dallas. Additional offices are in process of being located at San Francisco, Denver, Kansas City, Cleveland, Atlanta, Richmond and Philadelphia.

"The aim of these field offices," says Telford Taylor, SDPA administrator, "will be to bring more small firms from their areas into defense production and to assist small manufacturers with problems arising from the government's defense mobilization program. They will assist small firms in three primary areas: Contracts, credit, and materials."

Real Incentive System . . .

The short-sighted policy followed by the government in dealing with inventors is due for early reform.

The Government Patents Board, headed by Dr. Archie M. Palmer, in studying recommendations of the National Inventors Council, finds it has far greater authority under existing statutes to grant substantial awards than had been thought permissible.

As a result the government is expected to grant at least two cash awards of around $100,000 to government employees who have contributed outstanding inventions to the national defense or for the public good. Similarly, more liberal treatment is to be extended to private inventors who contribute new discoveries of significance to the public. The objective is a real incentive system.

AUSTIN EXPANDS ELECTRONICS ACTIVITIES: Because of expansion in the electronics field, the Austin Co. Special Devices Division, makers of automatic data recording systems, sonar simulation equipment, and several training devises, moved into the Port of New York Authority building. The added space makes possible straight-line electronics assembly shown above

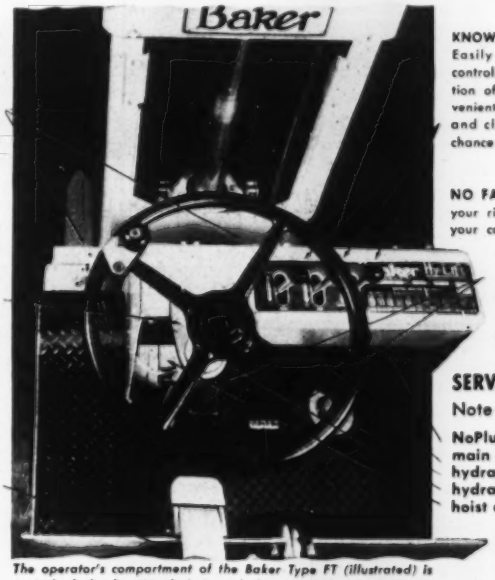
If you can drive an auto— you can drive the NEW BAKER FORK TRUCKS!

The advantages of greater operating convenience and maneuverability of Baker Trucks appeal to management as well as to truck operators. Simplicity of operation means no training period for new drivers. Ease of handling means more work per day. Increased visibility means greater safety and less damage to material handled. Happier operators mean improved employee relations.

SEE WHERE YOU'RE GOING—WHAT YOU'RE DOING! Cut-away design of control compartment, low dash, clean design, nested telescoping uprights, and off-center position of driver mean better visibility, less operator fatigue, more efficient operation and greater safety.

EASY TO STEER! Automotive-type steering wheel turns at a touch. Horn button at center of wheel—like on your car. Wheel is tilted to correct angle for tireless operation. Steering mechanism designed for maximum ease, minimum shock, and most positive control.

SOLID COMFORT! Sponge-rubber padded contour seat and back rest are adjustable to best position for efficient, comfortable operation. Unobstructed entry from either side of truck. Plenty of leg room. Spring action in seat sets brake.



The operator's compartment of the Baker Type FT (illustrated) is typical of the functional design of the new Baker Fork Trucks.

KNOW WHAT YOU'RE DOING! Easily manipulated levers for controlling hoist, tilt, and direction of travel, are located conveniently for operator's right hand and clearly labeled, reducing chance of error.

NO FANCY FOOTWORK! Use your right foot the same as on your car; accelerator pedal adjacent to brake. Foot is removed from accelerator to apply brake—another safety factor. Less footwork because of dynamic braking.

SERVICEMAN'S DREAM!
Note easy accessibility of

NoPlug controller,
main contactors,
hydraulic oil reservoir filler cap,
hydraulic pump,
hoist and tilt motor.

Because of accessibility and careful engineering, the New BAKER Fork Trucks can be serviced in a fraction of the time required for trucks of less advanced design. Compare the following times with the experience of your maintenance department:

Remove Power Axle	**60 minutes**
Remove Trailing Axle	**20 minutes**
Reline Brakes	**30 minutes**

Yours for the asking

Just off the press—16-page picture-story manual "CARE and MAINTENANCE OF INDUSTRIAL TRUCKS." Write for your copy today.

BAKER INDUSTRIAL TRUCK DIVISION
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Baker INDUSTRIAL TRUCKS

CLARK LOOP CONTROL

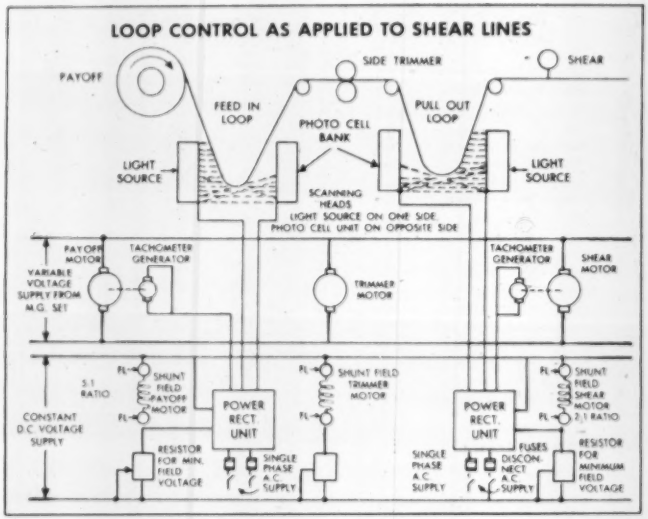
—FAST AS LIGHT!

for your HIGH SPEED PROCESSING LINES

ENTIRELY AUTOMATIC CLARK All Electronic Loop Control is used on many types of high speed continuous processing lines. It provides continuously varying field excitation over the entire motor speed range.

It uses no continuously operating relays, thus, with no making and breaking of contacts, there is NO MAINTENANCE PROBLEM. No mechanical mechanism touches the strip, hence the STRIP IS NEVER MARRED.

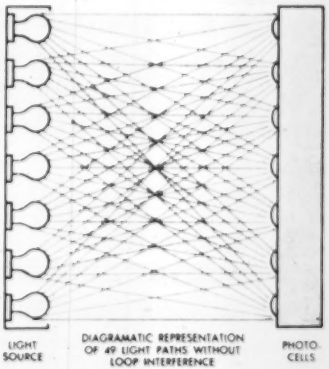
The basic element of CLARK Loop Control is a battery of seven photocells, with a light source of seven units. No lenses are used on the light source to concentrate the light beams, thus, if no loop is suspended between light source and photocells, 49 separate light beams can function simultaneously.



When light projected on the photocells is modulated by the loop, it produces a signal voltage proportional to the loop position. This photocell signal is amplified, and in turn controls the output voltage of the power rectifiers.

This varying rectified A-C Voltage is applied to the shunt field of the motor which controls the loop. When the loop moves from normal position, the amount of light on the photocell changes, thus producing a field excitation change in a direction to bring the loop back into normal position.

Thus, *with the speed of light,* CLARK all electronic modulated, *entirely automatic* Loop Control has *faster response,* and is particularly advantageous for use on *higher speed lines.*



The hundreds of successful, trouble proof installations are the best recommendation that can be given to CLARK Electronic Loop Control.

THE CLARK CONTROLLER CO.

ENGINEERED ELECTRICAL CONTROL • 1142 EAST 152ND STREET, CLEVELAND 10, OHIO

New Policy for West German Steel

Red tape of controls and artificially depressed prices are due to go out the window in West Germany as the Bonn government sets a new course for the German steel industry

THE WEST GERMAN government, currently using much sharper tones in political dealings with the West, intends to take steps to invigorate and strengthen the German steel industry. West Germans hope to help their cause at the conference table and in securing world markets by more efficient husbanding of iron and steel resources.

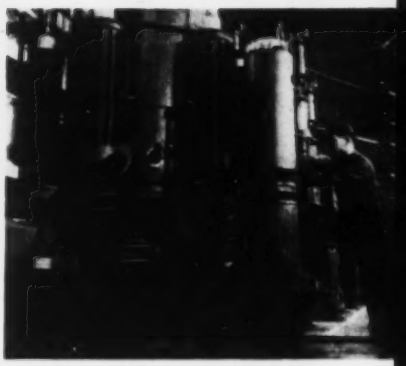
Ludwig Erhard, minister of economics for the Bonn government, says that all controls and artificial price ceilings will be lifted from steel as soon as possible. Following that, price lifting is planned for coal and iron and steel scrap.

Changing the Accent—The new policy will mean higher scrap iron prices which may result in less exports of scrap, coal, steel and other basic materials. More will be diverted into home consumption or into metalworking industries. Future emphasis will be more on exports of highly processed metal goods.

Hoped for internal results of the new program are: Stimulation of productivity and expansion of capacities and attraction of investment funds which so far have been made available only by state intervention. Also hoped for is a strengthening of West German bidding power for raw materials of foreign countries against the competition of the United States in particular. Most Germans fear a further deterioration, as they view it, of the raw material situation. They fear that Germany, a steel pygmie compared with the U. S. and Russia, will get only the crumbs of the raw materials table while the giants eat up more and more of available supply.

Irritating and Hampering—The allocation system and governmental red tape have been a source of irritation to German steelmakers for a long time. On the one hand, German light industry has no price control and is, and has been, in a position to make money, modernize and expand their plants. For example, Germany now has one of the most modern textile industries in the world.

On the other hand, coal and steel were forced to sell at artificially low prices, driving many companies into the red and discouraging investments. The control system is in such a mess at present that no orders, including export orders, are being accepted.



OIL CONDENSER: Built by Shibaura Electrical Co. Power program problem: Should it be public or private?

BALL-BEARINGS: Now a critical industry. Manufactures, often under foreign patents, are to close tolerances

Japan Crowds into World Market Picture

GERMAN steel firms are beginning to feel the pressure of Japanese competition on world markets. Japan is not able to absorb her present steel production of about 7.1 million tons yearly, and is forced to export at least 15 to 20 per cent of it. This is approximately the same amount of the present German steel exports.

The real pinch comes in the price—Japanese prices quoted f.o.b. are $5 to $10 a ton lower than German rates. Delivery terms for Japanese steel rarely exceed three months. German wire exporters are especially affected by Japanese competition with the result that quite a few manufacturers have already withdrawn from the world market. Only specialties like wire ropes can still be sold at satisfactory prices by the Germans.

Though the Japanese are competing mainly in ordinary steels, even ship plates are being offered. One ship builder in Rendsburg, Germany, is negotiating for 8000 tons of Japanese heavy plate.

No report has yet been made by the NPA's special three-man mission which went to Japan to investigate possible sources of machine tools (STEEL, Feb. 4, p. 52). NPA says the Japanese machine tool industry is probably the only one in the world not operating at full capacity. There are about 30 important machine tool builders in the country.

—Black Star

AUTOMOBILE BODIES: Mostly by hand. Foreign investors are slow to put capital in; they can't get it back

Cousins in Industry: CMP Hunts Family Facts

A proposal, resembling but not the same as the broad input-output plan, is being considered as a way to figure CMP requirements, even as a means of decontrol

WE'RE ALL related, but the job is often to trace the relationship.

Statisticians are applying that idea to industry. They think they can calculate the relations. If they're right, a new tool will become available to figure CMP materials and components requirements. The technique has been streamlined and simplified to such an extent that it resembles, but no longer is the same as, a more involved plan — called "interindustry economics" or "input-output" — stemming from the same concept of interindustry relationships. The CMP technique would be helpful even if controls are eased for it would aid in determining when and where such curbs are no longer needed.

The Trouble — Input-output is based on the idea that the entire American economy, from fish-processing to steel-producing, is interrelated and that what happens in steel-producing has a small but nevertheless calculable effect on an activity as remote as fish-processing. The trick is to calculate that relationship. Dr. Wassily Leontief, a Harvard economist, has been devoting himself to the job for the last 20 years and has had enough success to interest the Defense Department which has allocated funds to enable further study by him and by the Department of Labor's Division of Interindustry Economics, under the direction of W. Duane Evans.

The idea of the interrelationship of the economy is no new theory; it dates back nearly 200 years when Francois Quesnay, a French economist, toyed with the notion. He was stymied by inadequate statistics, a difficulty still troublesome today. Even now, Messrs. Leontief and Evans aren't the only ones working with interdependence of industries. During World War II when he was with the War Production Board, William C. Truppner — quite independent of the Leontief activities — studied interdependence as a tool to make the Controlled Materials Plan of that time work better. The war ended before he could make much progress.

Cause for Confusion — Now, as assistant DPA administrator, Mr Truppner is responsible for methods to make controls work. He has refined his version of the relationship idea, but because his and the Leontief-Evans plans stem from the same concept, many people erroneously believe the two are identical. So, some of the criticism leveled at the Leontief-Evans study — automatically and mistakenly — is directed at the Truppner ideas, too.

Actually, Mr. Truppner has gone ahead on his own because he thought the Leontief-Evans approach often was impractical for his purposes. The old input-output really involves a broad resources study that takes a lot of time and work because so many statistics are required. The input-output calculations now going on are for 1947. Would the interrelations figured for peacetime 1947 hold for wartime 1952? Nobody knows for sure. What's more, even the 1947 calculations aren't finished yet and won't be for a long time. Only a part has been published thus far and another chunk won't come out until June. To be useful in figuring what our controls should be, any calculations ought to be completed by summer, Mr. Truppner thinks. To be absolutely safe, the figures on which 1952 projections will be based should be gathered for some year — probably 1951 — which could be roughly comparable to 1952.

In a Nutshell—The problem of CMP men, then, is to find a way to get nearly current statistics quickly so they can calculate interindustry component and materials requirements, so, in turn, they can allocate ("program" is the Washington jargon) the existing components and materials. The requirements job has been done on a guesstimate basis thus far. Errors have been made and those have often thrown the programming haywire.

The contemplated requirements study would not replace CMP, as some critics claim. It's merely a tool to improve CMP. It would not bring pushbutton planning, as other detractors argue, because the technique aims merely to minimize human error in figuring requirements. It would be used as a science but still be backed up by art of human judgment.

Not Long—By sometime in March Mr. Truppner and associates hope to send out a questionnaire to about 6000 of the larger manufacturers of major components — there are about 100 in that "major" category. The 6000 queries on about 100 component groups is far leaner a sampling than the full-scale input-output would require, but

Mr. Truppner believes that's the optimum number to reveal quickly the interindustry relationships for users of steel, aluminum and copper in components. No questionnaires will go to basic metal producers unless some of their subsidiaries make the parts that go into end products. None will go to makers of end products unless, again, some of their subsidiaries make components. The compiling and calculating job — much of it

WILLIAM C. TRUPPNER
. . . his "relations" plan may work

to be done on electronic calculators, in Washington—may be completed by next summer.

CMP officials are still refining the questions they will ask, but most will query you on your metal and component requirements and facilities expansion. The questions will not primarily seek the number of pounds of steel or nuts and bolts you use, but the ratio of steel, nuts and bolts and other components required to turn out an electric motor or what-have-you. Alternate questions in the questionnaire will permit you to answer on another basis if you keep records differently than most companies. Where specific answers might take time or money to develop, the questionnaire will permit you to estimate because time is of the essence in the matter, and ratios, not absolute figures, are all that are required anyway.

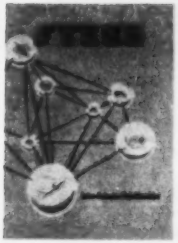
Close Call—If you compare the Truppner system with anything, the closest parallel is with the system of purchasing used by a company that buys lots of materials to make many small parts that go into end products. That company bases its requirements on stock records and past performances. That expanded for the whole metalworking economy, is the Truppner system.

If the plan works, it will make simpler jobs like these: The military and Washington planners decide that aircraft production must be doubled, tank output tripled, vacuum cleaner assemblies halved, refrigerator production cut 15 per cent. If that's done, how many motors, nuts and bolts and other components will we need? Note that the planners figure on the end products. The job of the requirements study is to figure components and materials only. As a by-product of the job, the planners may get a better idea of how much to cut civilian end-product output. Components may seem to be a minor factor in the economy, but actually they're a major one. They consume about two-thirds of all the carbon steel produced.

Support—A Steel Task Group headed by Allegheny Ludlum Steel Corp. Chairman Hiland G. Batcheller reports, among other things, that of all government functions in mobilization, the most ineffective is that of translating a program into a set of requirements. The proposed requirements study aims at remedying that fault. It would minimize situations such as that in structural steel where it's suspected but not proved that users have heavily overstated their needs. According to Mr. Truppner, his plan is a means of determining and substituting the judgment of skilled producers for the judgment of Washington planners.

The job ahead for the advocates of the plan is not easy. Can they convey to the 6000 parts makers what's being done? If not, the whole plan will fail. Advocates say they won't ask too many questions, but their idea of an involved questionnaire often doesn't jibe with industry's. If the questionnaires are too complex, the idea will fail. Finally, technical judgment must be applied to the data once it's obtained. The matter is not one of simply putting information into a computer and turning the crank. If not enough good technical judgment is available, the requirements study will be no better than the guesstimating techniques aready in use.

Patch Work—The proposed requirements study is no one-shot survey. It will be used on a continuing basis, so mistakes that turn up—and they will—in the first and subsequent runs can be remedied. Already, the techniques



Even though sometimes remote, there's a calculable relationship among all industries. To figure that relationship through statistics is the aim of a proposed new requirements study that may bring about a marked change in the functioning of CMP.

for carrying out the plan have undergone substantial revision which is still going on. In fact, the first technical details presented late last year to several industry advisory groups for criticism have been completely changed, especially regarding the length and detail of the proposed questionnaires. Ironically, some of the criticism of the plan that still exists is directed against the original techniques now in the ash can.

One reason so much work has gone into the requirements study is that a good plan is essential if World War III comes. In this period of "gray" mobilization we have time to experiment with Truppner's plans.

Farm Equipment Shortage Eases

The farm equipment shortage has eased a little in the past month, says T. B. Hale, sales vice president of International Harvester Co., Chicago.

One of the big problems is the unbalancing of supplies in the materials allocation program. When there is enough steel there is not enough nonferrous and alloys.

N-A-X HIGH-TENSILE STEEL

means less weight with no loss of strength or quality

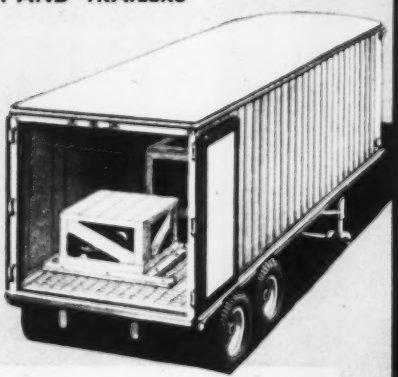
FOR BUSES . . .

The greater strength and toughness of N-A-X HIGH-TENSILE steel permits reductions of up to 25% in section without sacrificing durability or safety of product.

TRUCKS . . .

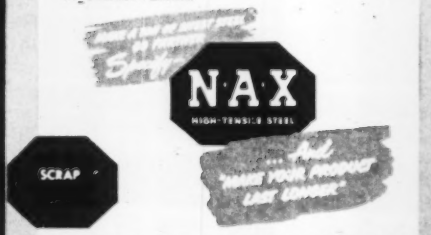
Through the use of this low-alloy, high-strength steel, with its enhanced resistance to corrosion, less dead-weight in military and civilian transportation equipment means greater payloads and longer life.

. . . AND TRAILERS



N-A-X HIGH-TENSILE steel, with its high degree of cold formability and excellent welding properties, permits a manufacturer of transportation equipment to fabricate it with the ease of mild carbon steel.

These few examples illustrate the use of N-A-X HIGH-TENSILE steel in transportation equipment. By utilizing its increased strength and toughness—its greater resistance to corrosion, abrasion and fatigue—its excellent response to fabricating and welding—you can make more products from the same tonnage of steel . . . an important contribution to conservation.



GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division • Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

International Harvester and Reo may revolutionize the truck industry by offering specially designed liquefied petroleum gas engines for their trucks

DETROIT

AN UPHEAVAL of unknown proportions is taking place in the truck manufacturing industry.

A tremor was felt when GMC Truck & Coach Division of General Motors invaded the medium-truck field with its "welterweight" three-cylinder diesel engine. Last week two other tremors shook the industry: International Harvester and Reo Motors announced factory-built liquefied petroleum gas engines for their trucks.

How Far?—What inroads these three new units will make on the gasoline engine market no one is willing to predict. One venture elicited from a Reo man is that if 10 per cent of their sales can be in LP gas units they will be "very happy," the gamble they have made in re-equipping their plant will be paying off.

LP gas has long been acclaimed the perfect engine fuel. And a brisk business has been to furnish conversion kits to enable users to adapt their gasoline-burning engines to use the gas. Several cities, including Chicago, have LPG-equipped fleets of buses, and its use in farm tractors has developed fast.

Special Design—Time has come, Reo and IH feel, to provide users with power plants made especially to use LPG. IH offers buyers of its heavy-duty Super Red Diamond engine-equipped trucks a gasoline or LPG option. Reo makes the LPG engine available in vehicles ranging in weight from 20,000 pounds GVW as a truck to 40,000 pounds GVW as a tractor. Wheelbases of the new Reo truck series range from 130 inches to 203 inches. Its engine is a 142 horsepower, 331-cubic-inch unit developing a compression ratio of 8.2 to 1.

Economy is the first consideration of a truck operator. LP gas gives it in two ways which count heavily — fuel costs and maintenance. At highway speeds an LPG truck gets about the same mileage as a gasoline-powered unit. But per gallon cost of LP gas averages about five cents lower. Because the fuel is completely clean-burning and does not dilute the oil, a big saving is also realized in over-all maintenance cost and longer engine life.

Stimulant — Distribution of LP gas is expected to be stimulated by the entrance of IH and Reo into this field. Currently few service stations in the North central area are equipped to handle the gas which must be transported and stored under pressure.

It is readily available, however, in the Southwest and West, and more retail outlets are being established in other parts of the country.

K-F Turns Out Aircraft Engine

Detroit's auto industry is back in the aircraft engine manufacturing business. Kaiser-Frazer's Detroit Engine Division delivered the first engine to its end-user, the U. S. Air Force, on Feb. 13. A Wright Cyclone R-1300, the engine is the first made by a Wright Aeronautical Co. licensee since the rearmament program began.

Assembling — Under its present subcontract, K-F is assembling the engines from parts manufactured by Wright. K-F, however, has almost finished tooling up its engine division plants at Detroit and Dowagiac, Mich., for parts manufacture and probably within the next two months the subcontract will be replaced with a prime from the Air Force and wholly K-F-manufactured engines will be produced.

Approximately 740,000 square feet of manufacturing space in the two plants are to be used for this purpose. Simultaneously as at Willow Run, civilian manufacturing continues. The Engine Division

CYCLONES IN DETROIT: Kaiser-Frazer Corp. is assembling two types of Wright Cyclone R-1300 engines for advanced trainers and helicopters. These air-cooled radial aircraft engines are the first built in Detroit since World War II

QUICK MOVE: First of 508 machines to be moved arrives at Chrysler Corp.'s new Trenton, Mich. engine plant from Highland Park. Complete trip took 48 hours for the lathe which will be used in truck and engine production at Trenton plant

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builds Kaiser power plants. Clarke Silcott, the division's general manager has disclosed that the number of aircraft units on order has been doubled within the last year and that two-shift operation will be used in peak production.

Larger splash—Significant as the first engine is, Kaiser-Frazer is on the verge of making a larger splash, military productionwise, when it completes its first C-119 Fairchild Packet. Promised for appearance last fall, this craft has undergone modification after modification as a result of combat experience over Korea. At last count in December there had been 7000 engineering changes since K-F began about a year ago to clear part of Willow Run for the cargo plane.

The televiewing public is to be treated to a glimpse of the first plane, designated K-F 101, its three sister ships which are on the assembly line, and of Willow Run's vastness on Edward R. Murrow's CBS television show "See It Now" in another week or two.

Chicago Scene of Auto Show

Chicago this week will be taking some of the glories away from Detroit with its 44th auto show, expected to draw a half-million visitors to the International Amphitheater. The industry probably will have more "show" cars in evidence for this affair than it has ever had before. These, however, will be just frosting on the cake. The angel food is the nineteen makes of passenger cars and nine of trucks on display, plus lavish accessory and parts exhibits.

One of the show's eye-catchers will be the new Nash-Healey sports car, featuring a newly designed handbuilt body by Pinin Farina. This is a car with an international flavor. Its engine and major mechanical parts are made by Nash in the U. S. Chassis is made by Donald Healey Co., Warwick, England. The custom bodies are fabricated by Farina's plant at Turin, Italy.

Farina's influence and the magic of his name in the world of sports car fanciers is such that his crest and name are prominently displayed on the side of the car while Nash and Healey come off a poor second with their identification in miniature letters in the center of the racing car airscoop.

For Nash, as for several other car and truck makers, including Cadillac and GMC Truck & Coach Division, 1952 is Golden Anniversary Year. One of GMC's presents to truck buyers is a Hydra-Matic-equipped parcel delivery truck, first commercial vehicle to be equipped with an automatic transmission. Designed for stop-and-go use, the ¾-ton truck also has a foot-operated parking brake.

Automobile dealers and factory sales managers have been gratified over the flocks of people who have trooped through sales rooms to admire and occasionally buy the 1952 offerings. On the first day the Mercury was shown, for example, more orders were placed than in any previous day in Mercury's history, and several dealers sold their allotments for the next six to ten months.

Auto, Truck Output
U. S. and Canada

	1952	1951
January	418,486*	645,688
February		658,918
March		802,737
April		680,281
May		695,898
June		653,682
July		522,858
August		571,442
September		505,758
October		558,971
November		480,199
December		404,547
Total		7,180,979
Week Ended	**1952**	**1951**
Jan. 19	98,669	161,867
Jan. 26	94,722	167,913
Feb. 2	102,402	150,984
Feb. 9	101,191	116,071
Feb. 16	105,000*	177,932

Sources: Automotive Manufacturers Association, Ward's Automotive Reports *Preliminary

DeSoto Gets Fire Dome Engine

How DeSoto would go about introducing its V-8 engine-equipped model after its 1952 product was already on the market has been the source of much conjecture. The Chrysler Division answered the question last week by bringing out the "Fire Dome 8," and identifying it with two distinctive features: An "air-vent" hood which funnels the air directly to the carburetor from an opening beneath the hood ornament, and chrome lettering on the front fenders proclaiming its name.

Containing the new 160 horsepower, 7.1 to 1 version of the Chrysler Firepower engine with hemispherical combustion chamber, the Fire Dome 8 also features power steering, power brakes, electric window lifts and tip-toe shift with fluid torque drive. Six-cylinder DeSotos continue to be manufactured, being designated as Custom and Deluxe models.

Car Prices: A Shock

What's happened to passenger car prices comes as a complete shock to most people visiting a show room for the first time in a year or two. Auto men periodically point out that relatively speaking car prices have gone up less than many other commodities, that in terms of hours' work to buy one a new car continues to offer more for the money than many other products.

While true, this argument falls on many deaf ears because most people find out only at infrequent intervals what the prices of cars are. Appreciative of the danger of pricing their products out of the market a number of manufacturers have not upped their wholesale prices to the full extent permitted under the Capehart amendment, some haven't increased any.

But while the factories are careful with their pricing, many dealers are up to their 1946 tricks again. A few will tell you openly that they will sell you a car only if you'll take a pile of accessories with it; more blame this loading on the factory, and say it's not their fault that cars are coming through with factory-installed extras. One of the favorite pieces of non-optional equipment is power steering.

Factory men deplore this practice, but few dealers are disenfranchised because of it. The buying public is the only group which can effectively do something about it, but many dealers are so firmly convinced a shortage of cars is in the making that they are settling down comfortably in the driver's seat and intend to stay there for the duration.

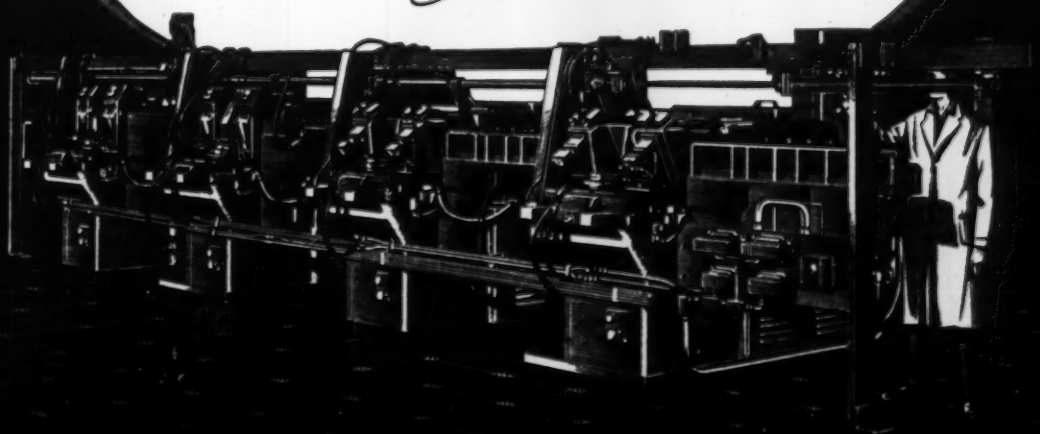
THE NEW BRITAIN MACHINE COMPANY

What names come to your mind when you think of progressive manufacturing?

MOST of the ones you think of first have bought New Britain Automatics within the past few years for new and better ways of doing important metalworking jobs. The New Britain-Gridley Machine Division, The New Britain Machine Company, New Britain, Conn.

AUTOMATIC BAR AND CHUCKING MACHINES • PRECISION BORING MACHINES
LUCAS HORIZONTAL BORING, DRILLING AND MILLING MACHINES

NEW BRITAIN
Automatics



STAINLESS STEEL FOR SUBSTITUTIONS

If your production is threatened by the short supply of critical materials stainless steel may be your answer. Several types of stainless steel are in good supply, and are competitive in price with other materials. Latest N. P. A. directives have made certain types of stainless steels obtainable without restrictions.

Our engineering department will be glad to consult with you to see if you can fabricate stainless with your existing tools. You may choose to save money by using lighter gauge material and take advantage of the superior strength of stainless.

For complete technical information and advice, contact the Sharon district office nearest you, or write direct to Sharon Steel Corporation, Sharon, Pennsylvania.

SHARONSTEEL

SHARON STEEL CORPORATION

Sharon, Pennsylvania

The Business Trend

Industrial production index moves up for third consecutive week. Balanced mobilization policy brightens prospects of good business for nearly everyone this year

PROSPECTS for favorable business weather throughout the year improve with each passing week.

That's because incorporation of a giant new industry—defense—into the economic framework will proceed slowly but smoothly in view of the enormity of the job. This year is regarded as the crucial one because defense impact on the economy will be greatest.

Of Paramount Importance—Yet under present policy of balancing mobilization objectives, no one's going to be hurt too badly by the arms program, even if it means again stretching the time required.

Several reasons, aside from economic and political ones, influence this policy of keeping civilian industry intact. One is that many weapons required are still well away from production stages. Another is a growing doubt that the machinery for the job will be available in quantities needed. And, reason the planners, once through the second quarter, more metals and facilities will be available for making weapons and a reasonable portion of nonessentials.

No Withering—With equity the flexible guide to setting production quotas, there's little likelihood of any major portion of the economy withering on the vine this year. That can be seen in the help even now being given to small business, nonessential producers, low-employment areas and depressed industries.

Relief in various forms will be seen frequently this year, particularly in the second quarter.

Rise and Fall—Weather is still cold, but the production fire is throwing out more heat. Basic industrial output in the week ended Feb. 9 moved upward for the third straight week. STEEL's index measured this activity at 213 per cent of the 1936-1939 average, a gain of 3 points from the previous week's final mark. Last year at this time the rail switchmen's strike partially crippled industry and dropped the index to 197. Preliminary indications point to a further production gain this month.

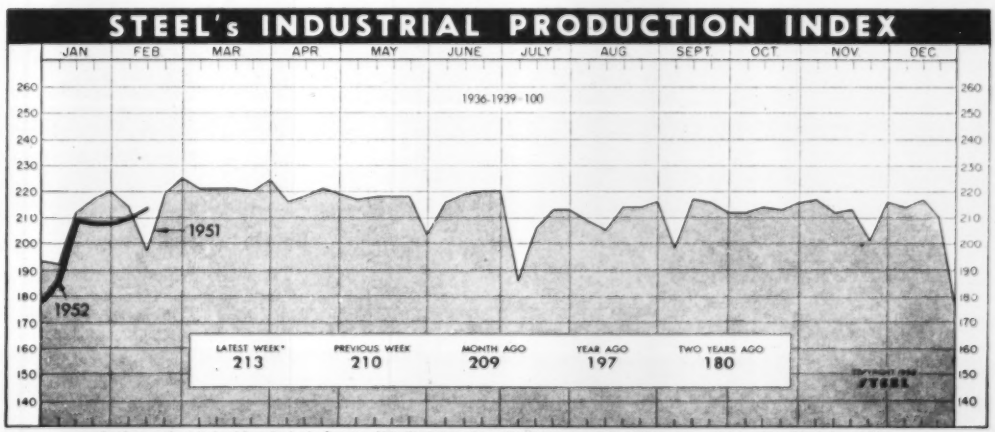
Steel Rate Steady . . .

Steelmakers' furnaces are even busier this month than they were in January, when 9,120,000 net tons of ingots were produced. The steel producing industry has yet to top the capacity mark regularly, but has consistently turned out over 2 million tons per week. American Iron & Steel Institute calculated production in the week ended Feb. 16 at 2,079,000 tons of ingots and casting steels. That's 11,000 tons less than output the week before, but 110,000 tons more than in the same week last year.

Auto Output Lagging . . .

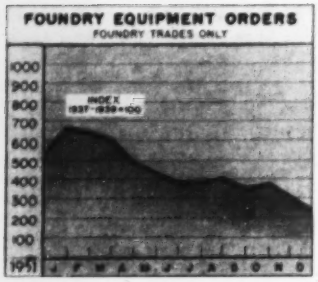
Auto industry production thus far in 1952 admittedly is lagging behind quotas, says *Ward's Automotive Reports*, though hopes continue to brighten for a higher production level in the second quarter. On metals allocations, *Ward's* says: "You can't build cars without steel . . . and when you have this metal, enough nonferrous stock is found somewhere."

The half-million point in the industry's production was passed in the week ended Feb. 9. This included 371,000 cars and 130,000 trucks. Last year at this time the count was 626,000 cars and 155,000 trucks. Latest week's tabulation shows the highest passenger car output of the year to date. Total U. S. and Canadian production in the week ended Feb. 9 (101,191



Based upon and weighted as follows: Steelworks Operations 35%, Electric Power Output 23%, Freight Car Loadings 22%, and Automobile Assemblies (Ward's Reports) 20%.

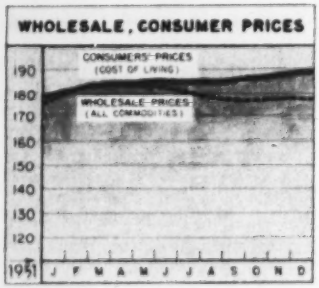
*Week ended Feb. 9



Foundry Equipment

	Index 1951	Index 1950	Value in Thousands 1951	Value in Thousands 1950
Jan	668.0	156.3	$3,075	$731
Feb	538.6	113.1	2,940	519
Mar	509.0	225.2	2,758	1,034
Apr	490.1	160.6	2,256	737
May	431.7	294.9	1,987	1,353
June	393.2	622.7	1,810	2,858
July	390.3	401.8	1,797	1,844
Aug	406.5	693.6	1,862	3,183
Sept	346.5	483.8	1,595	2,220
Oct	372.4	526.8	1,714	2,417
Nov	305.5	885.5	1,406	4,077
Dec	239.5	526.2	1,091	2,412

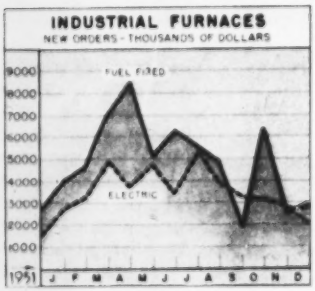
Foundry Equipment Mfrs. Assoc.



Price Indexes

	Wholesale (1926 100) 1951	Wholesale (1926 100) 1950	Consumers (1935-39 100) 1951	Consumers (1935-39 100) 1950
Jan	190.1	151.5	181.5	168.2
Feb	188.6	152.7	182.8	167.9
Mar	184.9	152.7	184.5	168.4
Apr	183.6	152.9	184.6	168.5
May	182.9	153.9	185.4	169.3
June	181.7	157.3	185.2	170.2
July	179.4	162.9	185.5	172.0
Aug	178.0	166.4	185.5	173.4
Sept	177.6	169.5	186.6	174.6
Oct	178.1	169.1	187.4	175.6
Nov	178.3	171.7	188.6	176.4
Dec	177.8	175.3	189.1	178.8

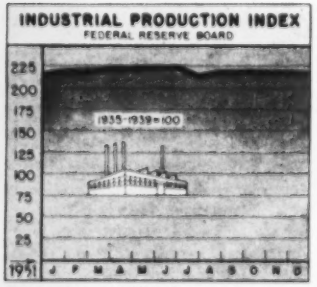
U. S. Bureau of Labor Statistics



Industrial Furnaces
New orders—Thousands of Dollars

	Fuel Fired* 1951	Fuel Fired* 1950	Electric 1951	Electric 1950
Jan	4,033	1,914	2,764	473
Feb	4,670	616	3,212	697
Mar	7,019	1,300	4,846	753
Apr	5,497	837	3,657	415
May	5,044	1,392	4,766	982
June	6,259	1,196	3,370	1,328
July	5,393	2,247	5,587	1,445
Aug	4,540	1,927	3,891	1,039
Sept	1,821	1,817	3,250	1,485
Oct	6,374	2,306	3,172	1,603
Nov	2,516	2,068	2,882	2,157
Dec	2,875	2,749	2,100	1,505

*Except for hot rolling steel
Industrial Furnace Mfrs. Assn.



Industrial Production Index

	Total Production 1951	Total Production 1950	Iron, Steel 1951	Iron, Steel 1950	Non-ferrous 1951	Non-ferrous 1950
Jan	221	183	255	203	224	180
Feb	221	180	252	201	218	190
Mar	222	187	263	205	212	200
Apr	223	190	264	222	210	198
May	223	195	263	226	206	197
June	221	199	261	231	204	207
July	213	196	233	228	198	202
Aug	217	209	254	236	198	212
Sept	219	211	257	243	201	216
Oct	218	216	261	253	202	223
Nov	219	215	261	246	209	226
Dec	218	217	263	253	210	227
Avg	220	200	259	229	207	206

Federal Reserve Board

Charts Copyright 1952, STEEL

Issue Dates of other FACTS and FIGURES Published by STEEL:

Construction	Feb 11	Ironers	Jan 21	Refrigerators	Dec 24
Durable Goods	Feb 4	Malleable Castings	Dec 31	Steel Castings	Dec 31
Employ., Metalwkg.	Jan 28	Machine Tools	Feb 11	Steel Forgings	Dec 31
Employ., Steel	Jan 28	Pumps	Dec 10	Steel Shipments	Dec 17
Fab. Struc. Steel	Feb 4	Purchasing Power	Feb 4	Vacuum Cleaners	Feb 4
Freight Cars	Jan 28	Radio, TV	Jan 21	Wages, Metalwkg.	Jan 28
Gear Sales	Feb 11	Ranges, Gas	Dec 24	Washers	Jan 14
Gray Iron Castings	Dec 31	Ranges, Elec.	Dec 24	Water Heaters	Feb 11

units) came closest in months to reaching the year-ago level (116,071 units). Last year, the unofficial railroad strike hampered operations.

Production Tumble Coming . . .

Freight car builders and private line shops are maintaining a level of production about equal to their CMP steel allowances, but face sharp cutbacks this year. In January, 8642 cars were delivered. That's more than 2500 over the January, 1951, figure of 5949 cars.

January production was slightly higher than December's 8458 units. Orders for 5338 new freight cars were received, bringing total backlog on Feb. 1 to 120,251—more than the entire 1951 output of 95,943 cars.

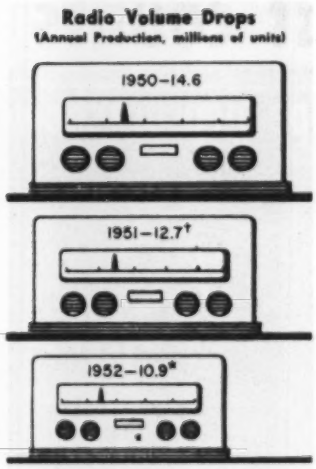
Workers Wanted . . .

Recruitment of more than 1 million "extra" workers from reserve groups in the population may be necessary to fill manpower needs by 1953, says the Labor Department. In the next two years an estimated 3.5 million workers will be needed, with the pressure greater next year than in 1952 (when net gain in manpower needs is expected to hit 1.5 million).

To provide additional manpower needed this year, total labor force will expand to 67.7 million by the fourth quarter. This increase equals the gain made during 1951 and exceeds "normal" annual increase by about 400,000. Defense manpower requirements at the end of 1953 are expected to total nearly 12 million (including armed forces), or about one-sixth of the projected total labor force. The Labor Department sees unemployment in 1952 dropping as much as 300,000 below the fourth-quarter average of 1.7 million.

Gain in Personal Income . . .

Personal income continued its upward march throughout 1951. The Office of Business Economics measured the advance from an annual rate of $238 billion in the fourth quarter of 1950 to $257 billion at the end of 1951. After mid-year the rate of increase slackened appreciably though. Nearly



† Preliminary. * Estimated. Source: Radio-Television Mfrs. Assoc.

all major components of personal income increased in 1951. There was a wide disparity in relative gains, with those in farm income and wages and salaries being disproportionately large.

Wages and salary receipts in 1951 were $166 billion, compared to $143 billion in 1950. Largest proportionate rise (one-third) was in government payrolls, which totaled $29 billion in 1951. Private industry payrolls rose from $123.5 billion in 1950 to $140 billion in 1951; manufacturing wages and salaries rose by $8.5 billion to a total of $58 billion in 1951. Construction payrolls rose more than one-fifth; all other private industry payrolls rose 7 to 12 per cent.

Trends Fore and Aft . . .

Preliminary estimates place the Federal Reserve Board's industrial production index for January at 218 (1935-1939=100), unchanged from December . . . Net railway operating income of railroads in 1951 was $942,696,259; return was over $1 billion in 1950 . . . Wholesale price index from Bureau of Labor Statistics will change in March from prewar to postwar base period . . . Business failures skidded to 134 in the week ended Feb. 7 . . . Pressure is mounting for decontrol of goods selling below ceilings. . .Industrial construction awards in the week ended Feb. 7 totaled $39.5 million . . . Secretary of Commerce Sawyer sees good business for the next two or three years, with only a minor letdown after Korean fighting ends. . . . Retail sales show signs of improving . . . About 88 per cent of the '53 budget will be spent to pay for past wars or for defense against a new one.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	100.0	99.5	97.0
Electric Power Distributed (million kwhr)	7,650	7,752	6,957
Bituminous Coal Output (daily av.—1000 tons)	1,737	1,870	1,569
Petroleum Production (daily av.—1000 bbl)	6,215[1]	6,225	5,861
Construction Volume (ENR—millions)	$167.1	$212.5	$355.7
Automobile, Truck Output (Ward's—units)	101,191	102,402	116,071
TRADE			
Freight Car Loadings (unit—1000 cars)	745[1]	731	573
Business Failures (Dun & Bradstreet, number)	134	164	191
Currency in Circulation (millions)[3]	$28,378	$28,347	$27,125
Dept. Store Sales (changes from year ago)[3]	+5%	14%	0%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$17,455	$15,850	$15,450
Federal Gross Debt (billions)	$259.8	$259.6	$256.0
Bond Volume, NYSE (millions)	$12.9	$15.7	$23.6
Stocks Sales, NYSE (thousands of shares)	7,531	8,975	12,800
Loans and Investments (billions)[4]	$74.0	$73.6	$69.5
United States Gov't. Obligations Held (billions)[4]	$32.4	$32.2	$31.5
PRICES			
STEEL's Weighted Finished Steel Price Index[5]	171.92[1]	171.92[1]	171.92
STEEL's Nonferrous Metal Price Index[6]	243.6	243.6	262.1
All Commodities[7]	175.8	176.3	183.3
Metals and Metal Products[7]	192.9	192.6	188.1

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1951, 1,999,035; 1952, 2,077,040. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1926=100.

SAVE STOCKROOM TIME

Requisitions to your stockroom for Pheoll Fasteners can be filled in less time. Boxes, kegs and packages are plainly marked with sizes clearly indicated for rapid identification. Pheoll's quality products handle easily, can be quickly counted or transferred to bins or assembly line trucks.

REDUCE ASSEMBLY TIME

Workmen gain time assembling with Pheoll screws, bolts, and nuts because they are accurately threaded, drive easily, seat rapidly, grip tighter—assuring stronger assemblies, easier inspection and less rejects.

IMPROVE YOUR PRODUCT APPEARANCE

The uniform quality of Pheoll Fasteners improves your product appearance. Precision slotted and finished heads, cleanly chamfered nuts, prevent marred surfaces and add to your product's sales appeal. Write for Pheoll literature and price list.

Save Costs... Increase Profits with these Pheoll Fasteners

ASK ABOUT PHEOLL Machine Screws† Machine Bolts Special Screws and Bolts Cap Screws Machine Screw Nuts Wood Screws† Thumb Screws Brass Washers Stove Bolts†

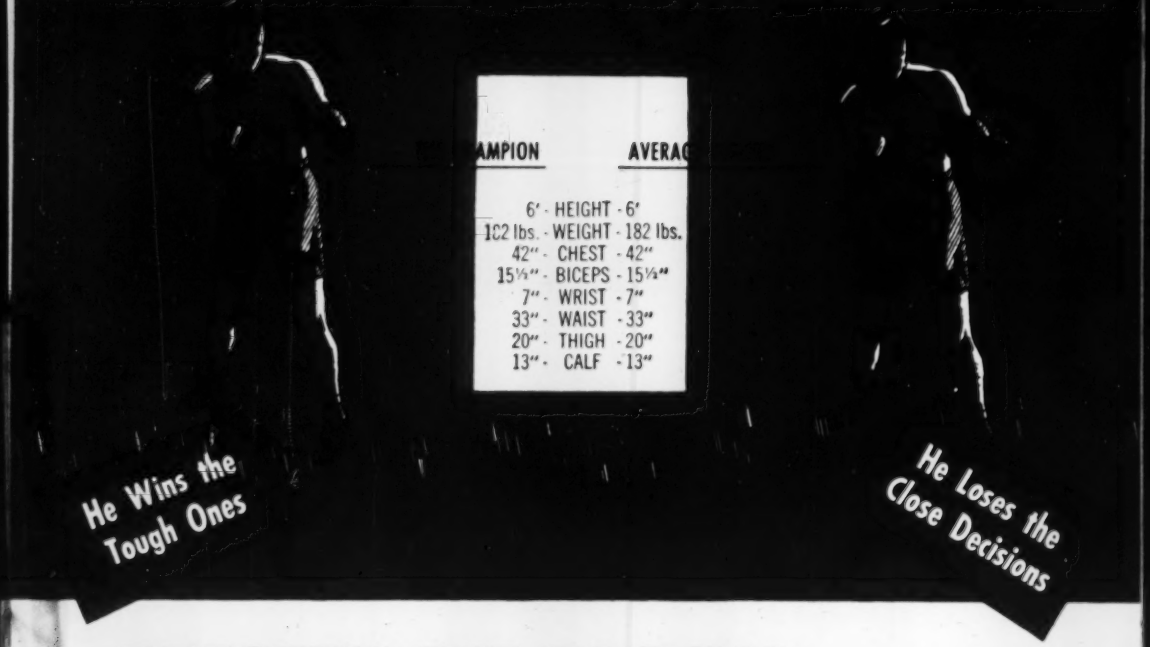
†Furnished in slotted and Phillips Recessed Head Types

Pheoll MANUFACTURING COMPANY
5700 ROOSEVELT ROAD
CHICAGO 50, ILLINOIS

Industrial Fasteners and Holding Devices

It's performance that counts

There's more to a "Champion" than the tape measure shows!


AMPION AVERAG
6' - HEIGHT - 6'
182 lbs. - WEIGHT - 182 lbs.
42" - CHEST - 42"
15½" - BICEPS - 15½"
7" - WRIST - 7"
33" - WAIST - 33"
20" - THIGH - 20"
13" - CALF - 13"
He Wins the Tough Ones
He Loses the Close Decisions

PRESTEM DIE BLOCKS...

have the qualities of a "Champion" in the field of die steel.

This new steel analysis was developed and recently introduced by Heppenstall for the hot working of steels in forging presses and upsetters. It is available in the form of blocks and bars for solid press dies, insert dies, upsetter dies, and punches. It machines readily at high hardness . . . has high impact resistance . . . can be water cooled during press forging operations.

Prestem's record in large automotive forge shops proves the following benefits for production:

1. **Resistance to abrasion and wear at high temperatures.**
2. **Resistance to heat checking during long runs.**
3. **Increase in production per die.**

For complete information, address Heppenstall Company, Pittsburgh 1, Pa. Sales offices in principal cities.

105,746 CONNECTING ROD CAPS were forged from this pair of PRESTEM dies. This is an INCREASE OF 150% over production obtained from standard Hot Work Die Steel.

Heppenstall

The most dependable name in die blocks

Men of Industry

GEORGE A. FYRBERG
production mgr., Norton abrasive div.

W. R. YORKEY
Electric Controller sales mgr.

ALTON J. HOLE
gen. mgr., Ford stamping div.

George A. Fyrberg was named production manager of **Norton Co.'s** abrasive division to succeed **Harold G. Dunbar,** retired after 39 years with the company. Mr. Fyrberg has been order service superintendent since 1944.

Dale C. Doty was named director of purchases for **Skilsaw Inc.,** Chicago. **John L. Schuler** succeeds Mr. Doty as purchasing agent.

M. J. Vollmer and **H. F. Detrick** were elected vice presidents of **A. O. Smith Corp.,** Milwaukee.

Superior Tube Co., Norristown, Pa., appointed **J. C. Turner** assistant treasurer. He was formerly director of purchases, and is succeeded by **C. F. McKenna Jr.,** formerly works accountant. **Kenneth L. Scheid** was named chief cost accountant.

John J. Lee, head of the Buffalo plant of **Twin Coach Co.,** was elected executive vice president of the company. **R. F. Geiger** becomes director of production planning and engineering in Buffalo, and **John A. Mattison** was named chief production engineer, succeeding Mr. Geiger.

George J. Wellner was elected assistant treasurer, **Caterpillar Tractor Co.,** Peoria, Ill. He succeeds **George L. Scripps,** recently named secretary-treasurer, Trackson Co. division.

W. R. Yorkey was appointed sales manager, **Electric Controller & Mfg. Co.,** Cleveland. He is succeeded as New York district manager by **R. J. Lincoln.**

George D. Potter, general sales manager, was promoted to director of sales, **Wolverine Tube Division,** Calumet & Hecla Consolidated Copper Co., Detroit. He is succeeded by **John M. Dumser.**

Michael C. Turkish was appointed chief engineer, coil spring department, **Eaton Mfg. Co.'s** spring division, Detroit.

Marshall H. Wagman is the new president of **American Tool & Supply Co.,** Pittsburgh. He succeeds **Joseph Wagman,** now chairman of the board.

W. M. Fairbairn succeeds **A. M. Johnson** as chairman, **Barnes Drill Co.,** Rockford, Ill. Mr. Johnson retires after 45 years of service with the company. Mr. Fairbairn was president and general manager since 1947, and is succeeded in those positions by **R. M. Andress.**

A. C. Paulson was appointed manager, St. Paul Branch, **Crucible Steel Co. of America.** He was district representative in Rockford, Ill.

American Air Filter Co. Inc., Louisville, appointed **Ray Ortgies** foundry supervising engineer with the dust control division.

Alton J. Hole was appointed general manager, metal stamping division, **Ford Motor Co.,** Buffalo. He is succeeded as manager of the Buffalo plant by **John B. Kendall,** production manager there since January, 1950.

James A. Nelson joined **American Machine & Foundry Co.,** New York, as manufacturing assistant to the vice president and general manager, general products division. Since 1947 he has been technical manager, Cribben & Sexton Co.

H. Stanley Bimpson was appointed chief engineer, steam turbine section, **Allis-Chalmers Mfg. Co.,** Milwaukee. He has been a consulting engineer in the office of the director of engineering, general machinery division. **Charles D. Wilson** was appointed engineer in charge of steam turbine design.

Karl A. Dietrich was named assistant to R. A. Eberstadt, president, **Barium Steel Corp.,** Detroit.

James C. Steffan was appointed vice president-general sales manager, **Chicago Steel & Wire Co.,** Chicago.

Ed Swiatek was appointed sales manager, **Diamond Machine Tool Co.,** Los Angeles. He has been associated with the machine tool business for 18 years.

Clifford N. Barber, production

manager, W & W Steel Co., was appointed manager, **Ceco Steel Products Corp.'s** reopened Oklahoma City, Okla., district office at 1225 Linwood Blvd.

William R. Barrett, general sales manager, was named a director and vice president-sales, **Rinshed-Mason Co.,** Detroit. **Joseph R. Mason,** assistant sales manager, automotive finishes, was elected a director and assistant secretary.

Gordon Rice, formerly sales manager, Parker Wolverine Division, Udylite Corp., was appointed general sales manager, **Oakman Mfg. Co.,** Detroit.

Clarence Dunlop was named a vice president, **Burroughs Adding Machine Co.** With headquarters in London, he will co-ordinate development of Burroughs international operations.

Gerlinger Carrier Co., Dallas, Oreg., elected **M. B. Gerlinger** president to succeed the late **Carl F. Gerlinger.** Other officers include **V. O. Williams,** executive vice president and general manager; **A. C. Gerlinger,** vice president; **Carl A. Gerlinger,** vice president-secretary; **J. W. Kitzmiller,** vice president-sales manager; and **J. C. Lundy,** treasurer.

Steven P. J. Wood was elected executive vice president, **Warner Electric Brake & Clutch Co.,** South Beloit, Wis. He has acted as both a sales and manufacturing executive with the concern and became vice president in 1949.

STEVEN P. J. WOOD
exec. V. P., Warner Electric

CHARLES N. CHALFANT
Hanson-Van Winkle-Munning cleaner sales

Hanson-Van Winkle-Munning Co., Matawan, N. J., appointed **Charles N. Chalfant** manager of industrial cleaner sales. He has been with Optimus Detergents Co.

American Cyanamid Co. appointed **P. E. Holder** assistant district manager of the St. Louis district for the industrial chemicals division.

David C. Hamilton was appointed Southwest district sales manager, **Duff-Norton Mfg. Co.,** Pittsburgh.

Richard E. Palmer was named assistant to the sales manager, **AiResearch Mfg. Co.,** Los Angeles. **W. J. Hanlon** assumes Mr. Palmer's former duties in connection with processing of customer orders.

Harry A. Fey was appointed traffic manager, **United States Radiator Corp.,** Detroit. He succeeds **F. J. Armstrong,** now a vice president of an interstate transit firm.

Walter Carlsen, assistant manager-sales, was advanced to general manager-sales, **Benjamin Wolff & Co.,** Chicago and Milwaukee metals warehouse.

Willard J. Dye was named assistant to the vice president, **Hydropress Inc.** and **Loewy Construction Co. Inc.,** New York.

Leon F. Miller, vice president-sales and engineering, machine division, was elected a director, **Osborn Mfg. Co.,** Cleveland.

Keystone Drawn Steel Co., Spring City, Pa., appointed **Gene Artinger** as sales representative for southern territory and central Pennsylvania.

Atlas Powder Co., Wilmington, Del., elected **W. J. Wiley** to the board of directors and as financial vice president. He assumes his duties in April.

J. W. Arnold, works manager, United Stove Co., was appointed general manager of **Erie Engine & Mfg. Co.,** Erie, Pa., to succeed **Harold Crist,** retired.

C. W. Thompson was appointed vice president-treasurer, **Gardner Machine Co.,** Beloit, Wis. **R. E. Price** was named assistant general manager.

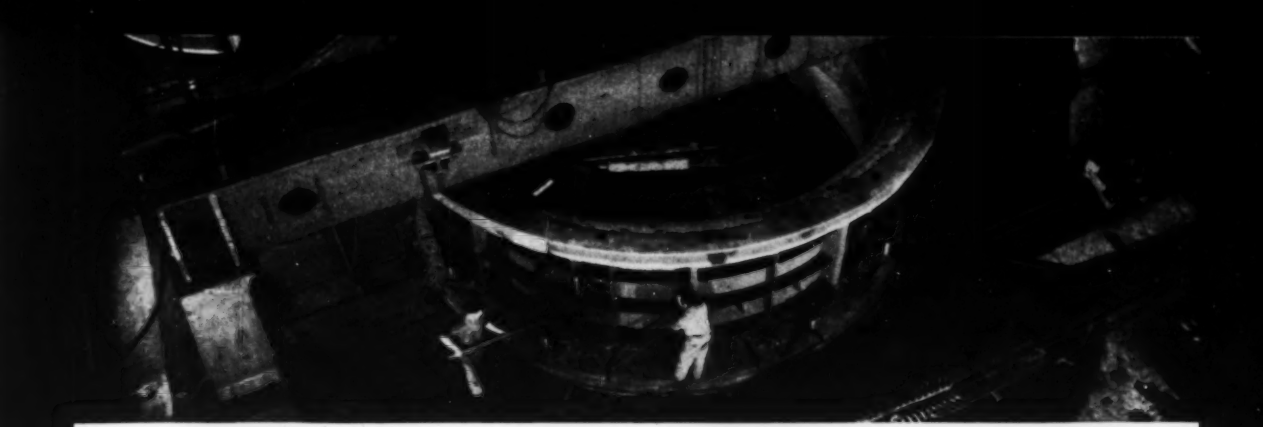
Irving B. Remsen Jr., formerly a division engineer of American Viscose Corp., joined the headquarters engineering staff of **Hall Laboratories Inc.,** Pittsburgh.

Magic Chef Inc., St. Louis, appointed **Fred J. Risberg** director of purchases.

E. D. Tull was named to the newly created position of vice president-personnel and plant at **Cummins Engine Co. Inc.,** Columbus, Ind. He was manager of manufacturing.

S. L. Johnson was appointed manager of the new methods development division of the 3M coated abrasives division, **Minnesota Mining & Mfg. Co.,** St. Paul. He will direct development of new machinery and techniques for conditioning carbon and alloy steels, and im-

S. L. JOHNSON
mgr. new methods div., Minnesota Mining

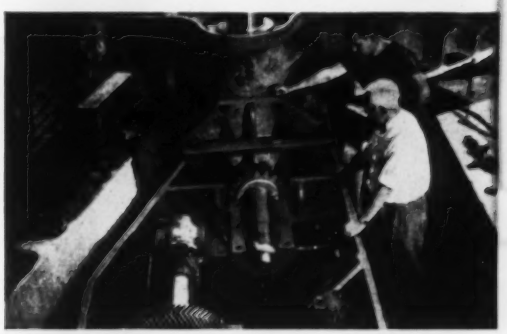


$400,000 VERTICAL BORING MILL, one of the world's largest, bores, turns and faces hydraulic turbine parts. Sunoco Way Lubricant, approved by 39 machine tool builders, was selected by the design engineers to prevent stick-slip with resultant scoring of ways and slides. Even under the weight of work as heavy as 75 tons, Sunoco Way Lubricant has never squeezed out.

TURBINE PARTS 62 FEET IN DIAMETER MACHINED BY HUGE VERTICAL BORING MILL

This mill was installed eight months ago by S. Morgan Smith, well-known hydraulic turbine manufacturer. Without alterations, it can take work up to 22 feet high with a maximum swing of 42 feet between housings. By removing the housings and adding a head to the face plate, it can be modified to handle parts 62 feet in diameter. Sunoco Way Lubricant, specified for the ways and rails by the design engineers, has been used exclusively. The mill accommodates work that weighs as much as 75 tons. No jump or stick-slip has ever marred a finish or impaired accuracy. The ways and rails remain like new. This is typical of the performance that has won the endorsement of 39 machine tool builders for Sunoco Way Lubricant. For an informative booklet and sample, write on your business letterhead to Sun Oil Company, Department S-8, Phila. 3, Pa.

ELECTRONICALLY CONTROLLED CUTTING TOOLS machine a turbine discharge ring 9' high, 27' 8" dia., 21' 8" bore. Sunoco Way Lubricant keeps rails free of rust and corrosion. Starting up after week-end shutdowns, tables and other parts move freely on the ways and slides without jump or stick-slip.



THE SYNCHRONOUS GEAR DRIVE, controlling table speeds from .004 to 6.045 rpm., is pressure-fed with another Sun "Job Proved" product—Sunep. This extreme pressure lubricant is exceptionally stable, minimizes wear, gives long-time protection to very heavily loaded teeth in many types of gear boxes.

SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

SUNOCO®

proved methods for grinding and finishing other metals.

Morse Chain Co., Detroit, appointed **E. E. Wesselhoff** assistant chief engineer. Formerly in charge of the Boston sales territory, he is succeeded by **H. N. Tyler**.

Andrew B. Stevens was promoted to assistant factory manager, **American Wheelabrator & Equipment Corp.**, Mishawaka, Ind.

Alfred W. Crew joined **Republic Rubber Division**, Lee Rubber & Tire Corp., Youngstown, as a field engineer. He has headquarters in Charleston, W. Va.

John M. Marston of **C. O. Bartlett & Snow Co.**, Cleveland, is opening an office in Pittsburgh at 91 Central Square.

Kelite Products Inc., Los Angeles, appointed **Louis McDonald** director of the Kelite development and control laboratories.

Arnold J. Karol was appointed assistant vice president, **M. S. Kaplan Co.**, Chicago.

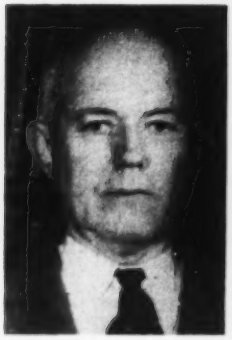
Robert W. Highley joined **Richard C. Remmey Son Co.** as sales service representative for the Cleveland area.

WILLIAM de BACK
will direct International Machinery

William de Back, a vice president and director, Food Machinery & Chemical Corp., San Jose, Calif., was named vice chairman and managing director of **International Machinery Corp. S. A.**, St. Nicolas-Waas, Belgium. The company is operated as an FMC affiliate and is jointly owned by Continental Can Co. Inc., Dewey & Almy Chemical Co., and Food Machinery.

Edwin M. Irish Jr. was appointed phenolic products sales manager, chemical materials department, **General Electric Co.'s** chemical division, Pittsfield, Mass.

Leece-Neville Co., Cleveland, promoted **Stanley Riha** to the new position of master mechanic.



HOWARD D. TURNER
supt. of Lukenweld div.

Howard D. Turner, assistant superintendent, inspection department, **Lukens Steel Co.**, Coatesville, Pa., succeeds **E. Raymond McClung**, resigned, as superintendent of the Lukenweld division.

Wesley H. Hoffman was promoted from Chicago district sales manager to general sales manager, **Harrington & King Perforating Co.** He succeeds **David K. Colesberry**.

Donald H. Rishor joined the sales staff of **Frederic B. Stevens Inc.** at Buffalo.

B. A. Bauer was appointed purchasing agent and supervisor of stores for the Oil City, Pa., plant, **Worthington Pump & Machinery Corp.**

OBITUARIES...

Morris E. Leeds, 82, chairman of the board of **Leeds & Northrup Co. Inc.**, Philadelphia, died Feb. 8 in Florida. He founded the firm as Morris E. Leeds & Co. in 1899 and in 1903 went into partnership with Edwin F. Northrup. He served as president until 1939.

Walter P. Berg, 60, vice president and director, **Dravo Corp.**, Pittsburgh, died Feb. 3. He was also a member of the firm's executive committee and general manager of the machinery division.

George Langen, 81, retired president, **Cincinnati Planer Co.**, Cincinati, died Feb. 2. He was president from 1945 to 1948.

Charles C. Smith, 57, president and chairman of **Hamilton Watch Co.**, Lancaster, Pa., died recently.

Samuel S. Carr, for many years editorial representative of STEEL, died Feb. 12 at home in Hamilton, Ohio.

Daniel P. Barnard Jr., retired director and former secretary-treasurer, **Joseph A. Vogel Co.**, Wilmington, Del., valve manufacturing firm, died Jan. 26.

Joseph R. Williams, 57, product manager of pavers and portable mixers at the Dunellen, N. J., plant of **Worthington Pump & Machinery Corp.**, died Feb. 1.

William L. Dean, 67, president, **Mathews Conveyer Co.**, Ellwood City, Pa., died Feb. 6 in St. Petersburg, Fla.

Otto Johnson, 61, owner, **Johnson Pattern & Model Works**, Jamestown, N. Y., died Feb. 4

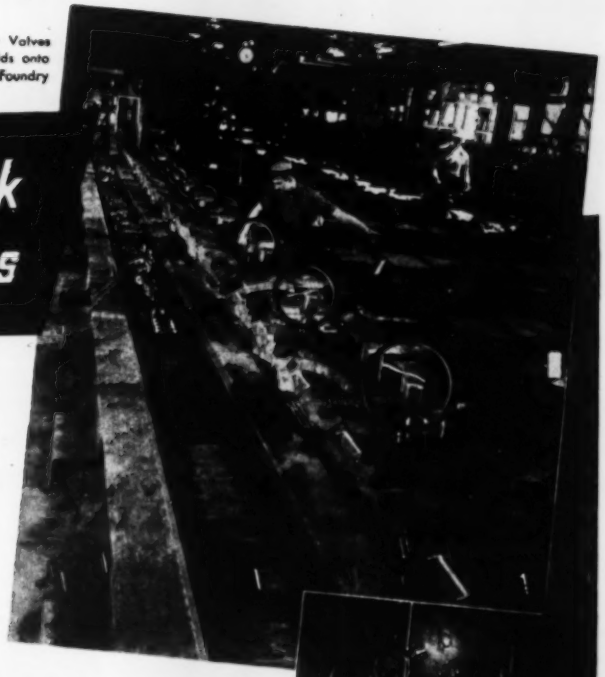
Phil Huber, 62, chairman of the board, **Ex-Cell-O Corp.**, Detroit, which he helped found in 1919, died Feb. 7. He was president from 1937 until last April.

B. A. Dollens, 50, a **General Motors Corp.**, Detroit, vice president and general manager of the Electro-Motive Division at La Grange, Ill., died Feb. 9.

Frank H. Dodge, Detroit sales manager, **Archer-Daniels Midland Co.'s** core oil division, died Feb. 10.

Michael F. Lane, founder and president of **Lane Stewart Co.** and **Acme-Lane Co.**, both of Chicago, died Feb. 4.

Hand Operated Air Valves Dumping Poured Molds onto Apron Conveyor in Foundry



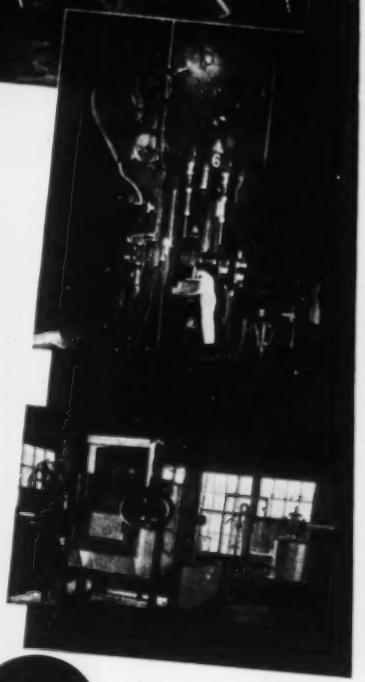
Quick-As-Wink Control Valves

un-paralleled performance and dependability

no after hours Siss-s-s-s

That low sizzling noise you hear out in the plant, after the work force has gone home, is there during the day too, only you can't hear it then. It's air. Seeping out through inferior valves it wastes from $5.00 to $500.00 per month — and — leaky valves mean sloppy machine control; danger of "repeating"; possible injury to the operator; or a break-down involving costly repairs, material spoilage, lost production and customer ill-will.

Stop that sizzling by installing Quick-As-Wink valves on your air and hydraulic controls. Positive and fast-acting Quick-As-Wink valves are designed and built with U-shaped packers that are expanded by pressure and seal tightly, preventing leaks, and minimizing the danger of break-downs and tie-ups. Recognized by operators, foremen and superintendents everywhere for unsurpassed air economy, high efficiency, low maintenance and long, trouble-free satisfactory performance.



Quick-As-Wink

AIR AND HYDRAULIC

Control Valves

Hand, Foot, Cam, Diaphragm and Solenoid Operated

Mfd. by C. B. HUNT & SON, INC., 1911 East Pershing St., Salem, Ohio

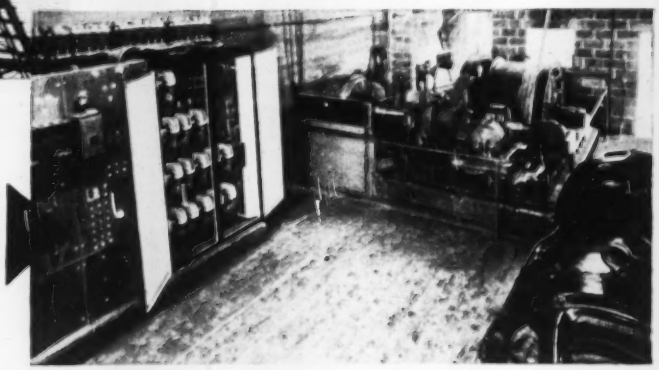
At the World's Largest Slag Plant — owned and operated by Birmingham Slag Company, Birmingham, Alabama.

AUTOMATIC CONTROL

Does What Human Hands Couldn't Do

●

Production schedule, averaging one trip per minute, now easily maintained.



New EC&M FREQUENCY RELAY Controller slows bucket by plugging to prevent overtravel and derailment of cars. Power occasionally re-applied as trip ends.

Previously, manual jogging by skilled operator could not always avert delays, even though downcar was aided by engaging counterweights to offset overhauling effect of car going over the knuckle at the top.

THE PROBLEM:

How to govern speed *from the ground level* as the loaded bucket reaches the top, levels out and quickly tips to dump. The motor load, a maximum driving value on the upgrade, falls off as the bucket levels out, and changes quickly to maximum *overhauling* as the bucket jackknifes to dump. An operator has little time to "feel" or judge the motor load under such swift or sudden changes.

THE SOLUTION:

EC&M Frequency Relays respond accurately to the slip-frequency of the wound-rotor hoist motor. As a loaded bucket reaches the top, plugging is automatically applied by the limit switch and the bucket reaches the end of travel with motor speed reduced to 17% or less. An empty bucket going over the knuckle operates in like manner. With a *heavily loaded* bucket, power may be re-applied after plugging but the motor seldom speeds up to a point where a second "plug" is required before the trip is ended. EC&M Frequency Relays provide a simple, accurate method of controlling plugging and accelerating contactors for smooth operation of the a-c skip hoist.

Contacts Lasted 3 Months— No Replacement Now in Over 2 Years

Previously, frequent jogging handling heavy currents accelerated contact wear. Since converting to automatic operation by Frequency Relays, movements are a minimum and examination after 2 years indicates no replacement will be needed for some time.

Write for your copy of EC&M Frequency Relay Controller Bulletin 9302-SK.

THE ELECTRIC CONTROLLER & MFG. CO.

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Production AND Engineering NEWS AT A GLANCE

SOUNDS IN CLOUDS—An ionic cloud that responds almost instantly to changes in strength of a high frequency electric field is the central feature of a new type electronic loudspeaker which has no mechanical diaphragm. The so-called Ionophone utilizes a platinum electrode heated to a high temperature to produce the ionic cloud. This cloud expands and contracts to produce sound waves with virtually no distortion. Conventional diaphragms, the inventor points out, respond so slowly to electrical impulses that their reproduced sound is distorted. They also have other limitations in the range of sound.

METAL INSTRUMENT CUSHION—An instrument mount that cushions shocks and damps vibrations at the same time uses metal like rubber. The mount is a cushion of woven Inconel wire mesh working with a spring. The wire mesh doesn't age, like nonmetallic materials. It operates under all weather conditions and at temperatures as high as 300 C.

5 MILLION POUND SQUEEZE—Lehigh University is installing the world's largest vertical universal testing machine, a 5 million pound capacity hydraulic tension-compression unit capable of performing full-size tests on 100-foot span plate girders and other structural materials. Housed in a new building on the Lehigh campus, the research facilities will make many new tests on all kinds of materials including aluminum and magnesium castings, fabricated steel, oil well shafts, wire rope. The machine and its auxiliary equipment will expand services offered fabricators, engineers and heavy manufacturing industries in proof-testing products.

TUNGSTEN CARBIDE SURFACE—Hard-surfacing ferrous alloys with cemented tungsten carbide produces a surface containing about 70 per cent tungsten carbide. Dry-abrasive-wear tests indicate a resistance about 80 per cent as good as sintered tungsten carbide and several times better than hardened steel or chilled cast iron. The hard layer can be made in thicknesses from 1/16 to ¼-inch and can be ground like sintered carbides. In applying the surfacing, first a cemented-tungsten-carbide rod is prepared by a simplified extrusion and sintering process. Then an inert arc-welding torch puddles the sintered-carbide rod on surface of workpiece.

STRIP WITH ZIP—Equipment builders have the answer to the problem of fast strip processing while keeping scrap losses at a minimum. Conveyors for carrying stock away from rear of shear allow the machine to work at full capacty. In coating paint or organic material to one or both sides of steel strip, roller coating installations reduce processing and handling costs to a minimum. Nesting blanks permits cutting parts from continuous wide strip and avoids waste end scrap. p. 94

MORE POWER, LESS COPPER—Output of tomorrow's turbine generators will be higher, and less copper and steel will be used in their construction as a result of Westinghouse's honeycomb cooling development. Instead of passing cooling hydrogen over insulated copper coils, the coils are made hollow, and the gas passed through the coils themselves. This inner-cooled, honeycomb effect places the hydrogen in direct contact with the naked copper where it can soak up and carry off heat produced within the winding.

TOOLING ECONOMY—No one will dispute that unskilled labor needs more and better jigs and tools to produce acceptable finished parts. Cost of this tooling can and often does zoom up into the wild blue. A British tool designer comes through with some practical ideas for keeping costs in bounds by using standard components to make up clamps, bodies and attachments. p. 98

MORE ACCURATE PATTERNS—Pattern-making operations in one plant have been cut as much as 50 manhours weekly by a sheet metal process which can produce 12 identical patterns simultaneously. Alternate sheets of pattern and heavy carbon are placed on the table. The layout is then made on top of the stack. One tracing of the template makes several patterns at one time. The technique not only reduces layout time but makes for greater accuracy because all patterns are identical.

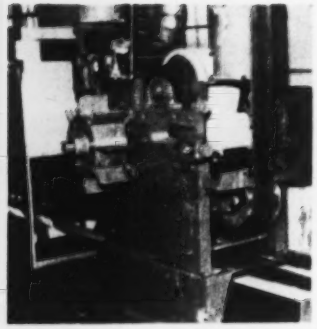
SHAKY THEORY—Blast furnace men have stressed on many occasions the advantage of carbon solution loss to furnace thermal economy provided the potential heat lost through the reaction could be generated by combustion of carbon at the tuyeres. This assumption now is open to question. When other phases of furnace operation permit the use of higher blast temperature then the reaction may be considered an advantage. p. 112

ALLOY NO. 8—Nickel can be conserved in the manufacture of small flat springs by using 12 per cent nickel silver sheet and strip in place of the 18 per cent alloy. This suggestion is made by ASTM committee B-5 on copper and copper alloys. Composition of the alloy is 56.5 per cent copper, 12 per cent nickel and 31.5 per cent zinc. The material is designated as alloy No. 8.

Metalworking Outlook—p. 57 *Market Outlook—p. 169*

More Zip for

Many methods lend themselves to the speedier processing of both coiled and sheared steel strip. Handling costs, waste and scrap losses drop when using right machines

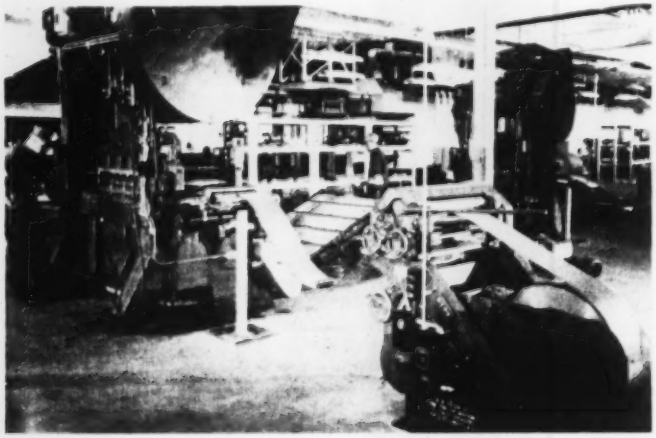


Roller coating one side of coiled strip steel. It feeds downward from overhead for coating by large diameter chrome-plated roll, then it moves on to baking oven. With extra set of rolls, both sides of the strip can be coated. Photograph: Gasway Corp.

STEELMEN usually think of strip steel in terms of coils, forgetting that metalworkers use the same term for strips sheared from sheet steel. Many metalworkers compound the error by regarding coiled strip as narrow, forgetting it can be obtained in widths up to 80 inches. Coiled or sheared, there are machines aplenty to speed processing of strip. In some types of fabrication, machines usually used for leveling sheets, with the proper feeding mechanism can perform continuous preliminary processing on wide coiled strip for highly finished die-drawn parts.

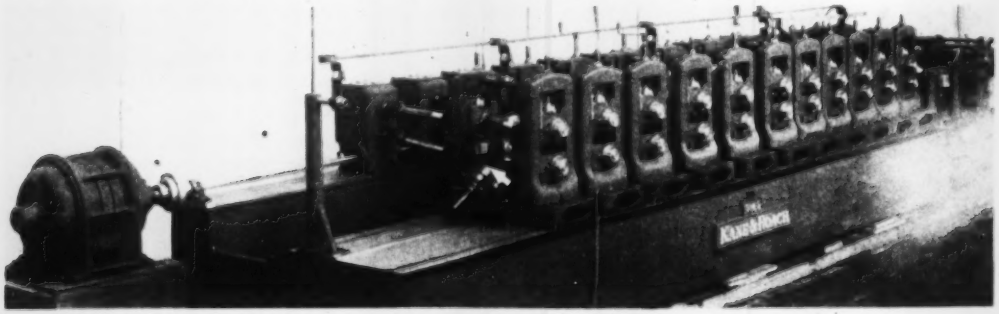
These machines have one series of horizontal rolls lying in a common plane. Material being straightened or leveled travels over the tops of the rolls. Above is a second series of rollers also arranged in a common plane. Rolls in the top series are staggered in relationship to the lower rolls.

Material has multiple-line pressure exerted upon both sides and travels a slightly serpentine path in reference to its thickness. Height of one series of rolls may be adjusted relative to the other. Machine both straightens material and improves its grain structure. Improvement in grain structure aids handling with deep drawing dies.



Coil cradle and feeder combination feeds press to left. Roller riding on strip between coil and press is attached to arm that is raised or lowered to control speed, assure maintenance of the loop. Photograph: E. W. Bliss Co.

Moving Sheared Strip — When sheet stock is sheared into strips, job is expedited by equipment for conveying strip away from the rear of the shear. Some manufacturers have developed conveyors of dual-



Roll forming machine produces continuous box-form from coiled strip steel. Arrow points to section as it leaves machine. Shearing unit not included in the illustration is part of the setup. Photograph: Kane & Roach Inc.

Strip Handling

By JOHN E. HYLER

chain type, with cross bars having pins that support strips as they leave the machine.

A conveyor to carry sheared stock away allows a shear to work at full capacity. One portable conveyor for use with a shear is mounted on casters. It is provided with adjustable pickup chute, which butts against the shear bed. Strip slides down pickup chute, onto traveling conveyor or table. Here, strip is caught by toggles, then picked up by horizontal angles having round steel fingers which reach below the table deck and push the material in front of them.

Strips drop into a stacker. Conveyor table is adjustable. Where highly accurate and clean cut shearing in required on lighter-gage materials of any appreciable width, sag in the sheet ordinarily destroys accuracy. A conveyor can be adapted to correct this condition.

The conveyor has a pneumatically-operated series of plungers, which rise to height of the shear table. When the shear treadle is engaged, plungers support the overhanging end of the material in a horizontal plane while its edge contacts the back gage. After shearing, the plungers drop below back gage level and place sheared material on the horizontal conveyor. Return of plungers to support position is delayed sufficiently to allow sheet to pass completely over them.

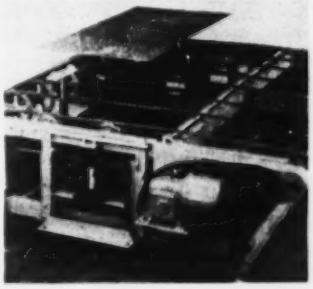
Roller Coating—Paint or organic material can be applied to one or both sides of steel strip by roller-coating installations. Roller coating is a fast and economical method of painting if a finished product can be fabricated from material previously coated; and there are a number of flexible finishes that withstand pressures of forming and punching. With the use of roll forming equipment, it is possible to form products and cut them to length from coated stock at a high rate of speed. If a punch-press or press-brake is to be used on precoated stock, dies should be highly polished and plated in order to avoid damaging the finished surface.

Speed at which strip is finished depends upon drying time of coating material and baking oven. If enamel requiring a 1-minute bake is being used, it would be necessary to have 1 foot of oven length for each foot of strip travel per minute. A 60-foot oven would give a coating speed of 60 feet per minute.

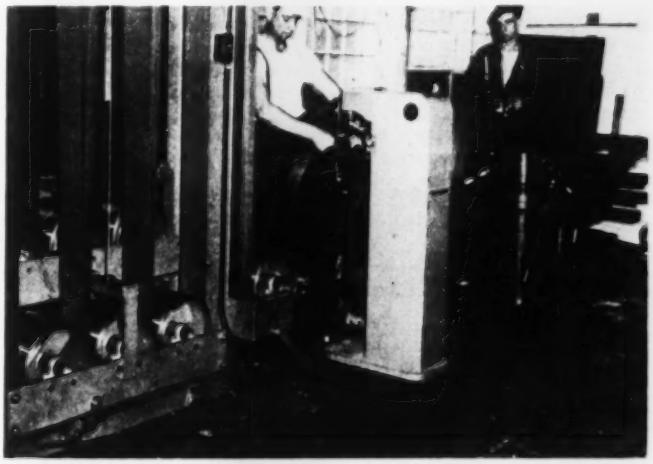
When strip is to be coated on both sides, a tension device must be used ahead of the roller coater, to prevent stock from contacting the oven floor. Amount of tension depends upon weight of stock and oven length. If coated on one side only, little tension is required, and strip can be supported on rollers.

Coiled strip stock usually is coated on a continuous basis. Loading is accomplished by using two unwinding reels for each strip. While one reel is in operation, the other is made ready. Before end of coil is reached, remaining stock is pulled off and the loose end is welded or clipped to the new coil.

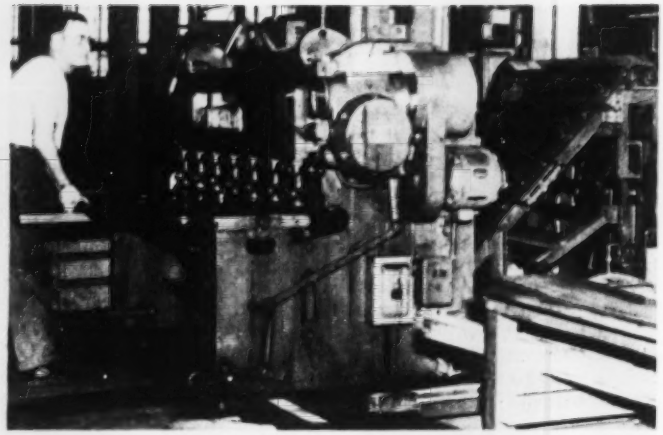
Constant speed is essential in successful strip coating. Strip moves through roller coating machine and oven by means of drive rolls which operate independent of the re-coiling mechanism. Rewinding drum is driven by an adjustable friction clutch, which supplies sufficient tension to wind a tight and even coil. Finished coils are removed by disengaging the clutch, cutting the stock and sliding the finished roll from the collapsible winding-drum shoes. Clean-



For light gage strip material of appreciable width, conveyor with plunger removes sag, assures greater shearing accuracy. After shearing, plungers drop down. Photograph: Fried Steel Mfg. Equipment Corp., New York



Double coil, pivot-type reels unwind coil for coating. Double strip accumulator at left allows two minutes time for operator to change coils and join strip end to new coil without any interruption of travel. Photograph: Gasway Corp.



Shearing strip from sheets. Conveyor at right carries strip to a stacker or other conveyor, allows shear to work at top speed. Pins on angle iron across conveyor chain catch strip. Photograph: Cincinnati Shaper Co., Cincinnati

ing and treating metal strip prior to painting may be done on a continuous basis. This reduces processing and handling costs to a minimum.

Fast Coil Loading—Double-coil, pivot-type unwinding reels facilitate changing coils at the infeed end of a strip-steel roller-coating line. Empty side of the reel can be loaded while the other side is in operation. An operator releases a lock pin and pivots new coil into operating position. A device known as a strip accumulator is employed at the infeeding end of the line, which permits a short time for the operator to change coils and join the strip ends. There is no change in speed of strip feeding through coating rolls and oven.

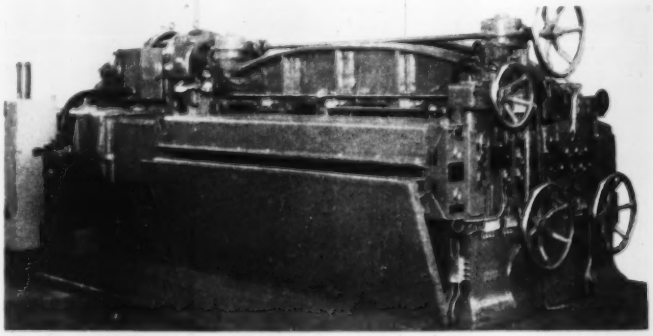
Automatic roll feeds for coil stock are rack and pinion type. Driving disk mounted on the press crankshaft actuates rack. Other roll feeds for feeding coil strip stock at the press receive actuation from the press crankshaft through a sprocket-and-chain assembly. Some coil stock press feeds have feeding action through a special feed block. Others operate from a driving eccentric mounted on the press crankshaft. Certain press feeding devices feed coil strip with special cylinders which roll freely in one direction but lock when moved in the opposite direction. Some roll feeds have a self-contained drive which operates independent of the press, and is controlled electro-pneumatically.

There is increased use of wide strip stock for feeding presses and stamping out blanks formerly cut from dimensioned sheets. Using wide strip allows nesting of different types of patterns and effects saving in the cost of blanks. Where blanks can be nested, (as for instance many automobile body blanks) parts are cut from continuous strip, avoiding waste ends.

Hydraulic feeding and straightening machine has been developed with a heavy-duty coil cradle for feeding wide coil steel to presses. Units are portable, may be moved to any press desired. Hydraulic drive allows the material to be inched into the first position under power. Feeding length is controlled by an automatic measuring device. This can be adjusted to feed any length from 25 to 125 inches. Several installations of the Iron Hand are in service of presses where wide coil stock is being processed.

Continuous Milling—An out-of-the-ordinary application for strip material is continuous processing milling. It has been performed on heavy strip in several instances. A continuous motor-driven milling fixture is applied to the milling machine table. Unwinding and rewinding reels are used at the infeed and outfeed ends of the milling machine table. Infeed rolls are ground flat, to conform to the strip before the milling operation; outfeeding rolls conform to the shape of the material after milling.

Where high production in large lots is desired, special setups are employed for steel strip. There are special cutup lines which make use of a coil cradle, a roller leveler, and a rotary-drum type Geneva shear. Coil-feeding lines advance coiled strip through pinch rolls through a roller leveler then through a measuring unit to an open-side press, for blanking or stamping. Special forming machines are used in connection with flying punch-type cutoffs. Feed-roll types of forming machines are provided with a saw type of cutoff. In some instances, cold-roll forming machines employ a cutoff for cutting sections to length, and also a unit at the infeed for notching, punching, etc. Flying cutoff saws in some instances are said to be better on such machines.



Roller leveler used for leveling steel strip and for processing strip to be worked with deep drawing dies. Photograph: McKay Machine Co., Youngstown

Holding Fixtures Simplify Fatigue Testing

Tests of materials and mechanical parts can be set up easily to simulate actual service conditions. It may tax engineering ingenuity but most fixtures used turn out to be simple

SETTING up tests for materials and machine parts to stimulate stress conditions under which the material, machine part or structural element operates, taxes engineering ingenuity. On the other hand, in spite of frequent apparent necessity for complexity in designing fixtures for simulated service tests, most of such fixtures have turned out to be simple.

Often, it is impossible to analyze theoretically or photoelastically involved three-dimensional arrangements of stresses. Such variables as internal residual stresses, surface condition of a part, which result from differences in fabrication method, and the notch sensitivity of the surface metal make an entirely theoretical analysis almost hopeless. In such instances fatigue tests of assemblies are necessary.

Function of Sonntag testing machines, which range in capacity from 20 to 20,000 pounds, is to apply a vibratory force and motion to any specimen, machine part, or structure that can be attached between the heavy stationary frame and reciprocating platen. The applied force can have any static or alternating component ranging from zero to capacity in either direction.

Gear Tooth Testing—In the setup for testing gear teeth, Fig. 1, only the block holding the stationary gear is specially made for this test. The vibrating gear is mounted on a lever arm and bearing block that are parts of a standard torsion fixture. Fixtures for larger gears would have to be specially designed to suit size and type of gear and magnitude and type of load to be applied on the teeth.

Crompton and Knowles Loom Works used the SF-1-U fatigue machine to subject rod daggers, binders, and shuttle boxes to fatigue tests. The rod dagger testing fixture is shown in Fig. 3. Round rod member of the part is clamped rigidly to the side of the base fixture. Only one of the two clamps is shown in place. The tapering rectangular dagger member of the part is vibrated at its free end as a simple cantilever beam by means of the needle-bearing double link.

Fatigue stresses are primarily a test of the joint between the round rod and the dagger members of the part. Results show that butt-welded joints are considerably stronger than those that were silver soldered.

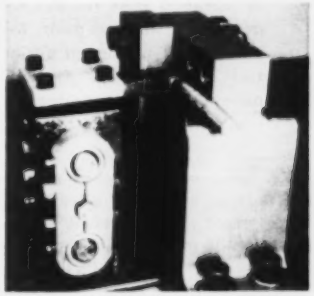


Fig. 3—Joint of rod dagger for a textile machine is fatigue tested by vibrating free end (left) while round rod member is clamped rigidly. Only one of the two clamps is shown in place

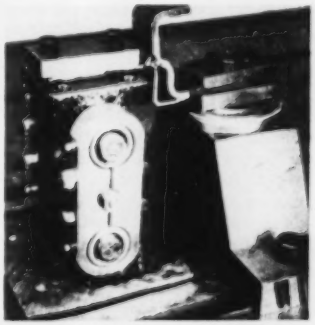


Fig. 4—Special fixture for fatigue testing textile machine binder includes a base with a round platen that permits easy alignment of the part with minimum compression stress. Standard link applies vertical vibrating force

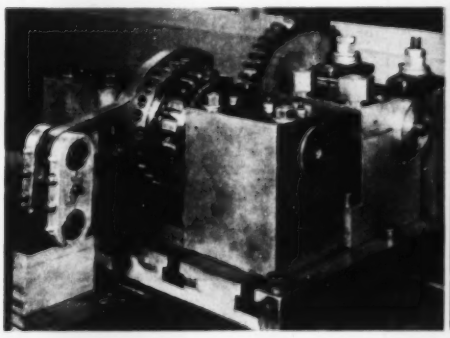


Fig. 1—Fatigue testing gear teeth, an example of simulated service testing through the use of a Baldwin-Sonntag universal fatigue machine

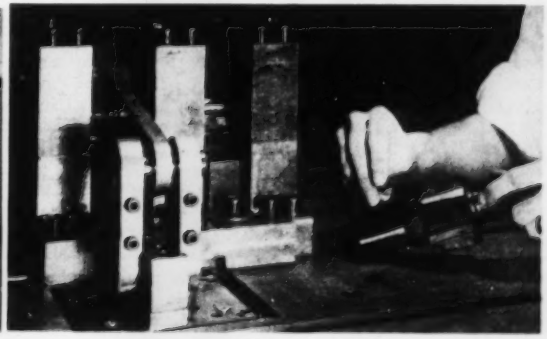


Fig. 2—In this fatigue test of pinion teeth, pulsating loads are applied in one direction only, making it possible to use a block that engaged one tooth

Tooling Can Be Cheaper

As demand rises for jigs and tools to help green labor produce acceptable finished parts, tooling costs head into the stratosphere. One British equipment designer pulls them back to earth by using steel shapes for clamps, bodies and attachments, by welding components, by using fasteners, cold rolled steel bars and drill rod

By F. E. RILEY
Tool Engineer
London, England

ONE result of stepping up output for defense work is the increased employment of less skilled labor. This results in greater demand for jigs and tools which must be provided, even for short runs, to enable comparatively green labor to produce acceptable components with minimum scrap and minimum supervision.

Only way to intensify jigging and tooling of a plant is to design equipment so cost is reduced. This can be accomplished by incorporating in tool designs, materials which are readily available. At the same time, the tool designer must try to avoid expensive machining operations during manufacture of the tools. He must also keep in mind the load on the toolmaking department and make provision for a lot of toolmaking to be performed by persons of low skill.

Use Rolled Shapes — Here are some methods which can be utilized to reduce tooling costs. Use rolled steel structural shapes in every possible way for making clamps, bodies and attachments for tools. Fasten the maximum number of parts by arc welding instead of assembling by means of drilled and reamed holes, ground pins, tapped holes and jig bored dowel holes. Use to the fullest possible extent, common items such as standard nuts, bolts, washers and cold rolled steel bars and drill rod. Make full use of metal-cutting band saw.

Fig. 1 at A and B shows thumb screws, two common items used in jig and fixture work. Many firms expend a lot of time and high grade labor turning and milling such items to shape. A suitable thumb screw can be produced cheaply by filing to shape a finger grip from flat material as in A and inserting this into the slot of an existing stock screw and brazing.

Another thumb screw B, is made up by sawing in half a suitable steel washer and brazing this into the slot of a fillister head screw. The smaller finger grip is used where the work might be distorted by excessive screw pressure and the smaller finger grip limits the amount of pressure which may be applied by the screw. These stock screw threads can be toughened by giving them a light hardening treatment in a cyanide bath. This should be done prior to brazing on the finger grips.

A common T-wrench or bolt used in jigs and fixtures for light sheet metal and plate work is illustrated at C. This is made by welding a piece of drill rod or mild steel to an ordinary screwed stud which can be of any desired length.

Quick-Acting Fasteners—Quick acting clamping nuts which can be spun on their bolts are widely used in tool work. Common practice is to use a cast iron knob which is drilled and tapped centrally. Obtaining a balance between knob diameter and thread calls for a wide range of patterns. With the construction illustrated at D, length of the projecting pins can be made to suit any required degree of clamping pressure. By welding pins to the flats of hexagon bolts, quick acting clamping bolts are produced.

Hinge bolts are used in many forms of drill jig. Some of them are elaborately constructed, involving much expensive machining. This is unnecessary. The swing bolt shown at E is a modified square-headed bolt with the width across one pair of flats reduced to that of the bolt thread diameter, by sawing.

Swing bolt in position in part of a jig is shown at F. Two hinge brackets placed on either side of the bolt head are welded to the main body of the jig. Swing bolt and hinge brackets are best treated as a complete assembly. A lot of complicated machine work can be avoided by drilling the hole through the bolt so the hinge pin must be driven into it, while the pin holes in the brackets are drilled to an easy running fit for the pin.

Clamping Plates from Angles—Clamping plates, complete with packing plates or heel supports can be sawed out of structural angles as at G. Drilling, bandsawing and rough hand filing are sufficient to produce the clamp which can be arranged to swivel out of the way when unclamped or to slide away from the component by the judicious placing of stop pins and other simple devices which may be welded on or driven into the drilled holes.

One form of swing-away clamp for securing a component to the under face of a platform or table drill jig is shown at H. This clamp is also used successfully inside a box jig in which case the only control over the clamp was by spin nut on the outer surface of the jig. The clamp plate is sawed out from structural angle iron and a standard bolt welded to it passing up through the jig plate to the spin nut.

When the nut is turned for clamping, the clamp swings into place for holding the component and is stopped in the correct posi-

tion by means of the stop pin. When the spin nut is turned for unclamping, the clamp swivels away clear of the component, but is prevented from swinging completely out of control by means of the one stop pin.

Simplify Jig Feet—Jig feet are often made unnecessarily elaborate; and it is a common practice to make these detachable. The jig feet are never removed once placed in position. One simple form of foot, shown at I, consists of a short piece of structural angle welded to the jig base plate. It can be of any desired height to suit the conditions of the jig and may be case hardened before it is welded in position.

Another form of jig foot is shown at J placed on the corner of a box jig which has to stand on all four of its sides so the component can be drilled from several directions. The feet are simply the edges of the top and bottom plates of the jig. Clearance between them is removed by the bandsaw. This form of jig foot has the disadvantage that it can slip into the T-slots of the machine table. The foot shown at I does not have this disadvantage.

Corner Pillars—Box jigs which incorporate top and bottom plates require corner pillars to hold the plates apart. A pillar made from structural angle iron is shown J, welded into place on the jig plate. Weight of the jig is reduced considerably.

Where it is necessary to locate a fixture in the T-slot of a machine table, locating blocks are secured to the fixture's bottom surface. One cheap version of a locating block is shown at K. Before welding in place, the block is hardened, and grinding allowance provided on its width.

In normal jig and fixture practice, it is usual to prepare the component parts with great care and precision so that an accurate

(*Please turn to Page* 123)

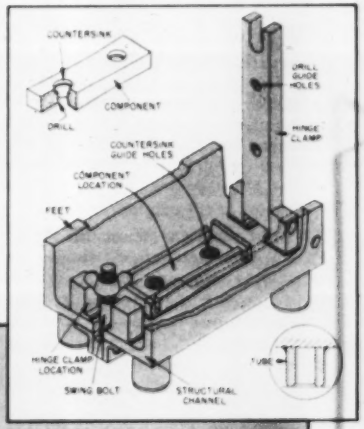
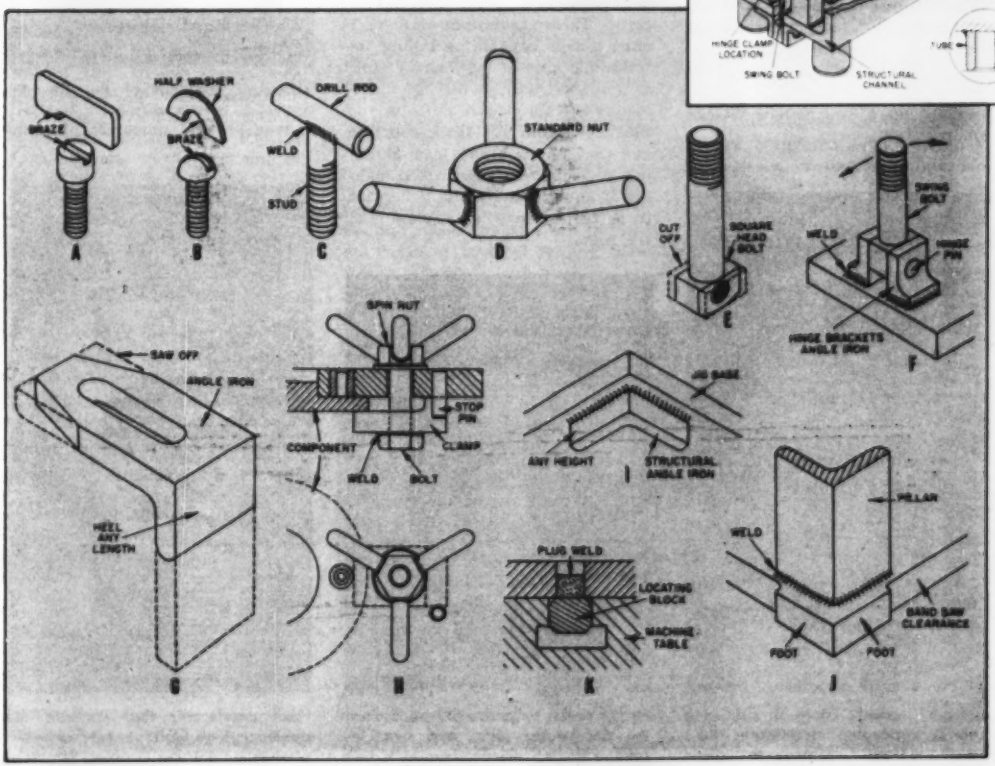


Fig. 1—(A) and (B) Thumb screws used in jig and fixture work, (C) T-wrench or bolt, (D) quick-acting clamping nut, (E) hinge bolt, (F) hinge bolt in position in part of jig, (G) clamping plate, (H) swing-away clamp for securing component under face of platform or table drill jig, (I) simple form of jig foot, (J) jig foot placed on corner of box jig, (K) cheap version of locating block

Fig. 2 (right)—Simple drill jig for drilling and countersinking a mild steel link



ELECTRONIC HAMMER . . . Forces Metal to Change

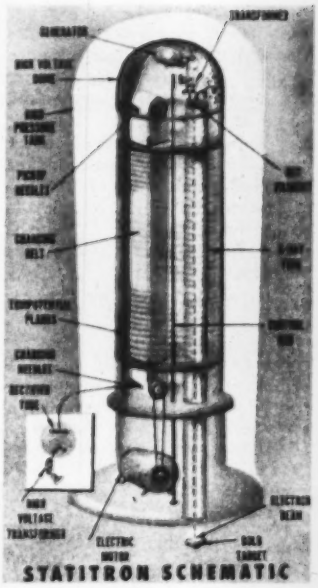
Statitron stores up electrons, sends them hurtling down upon a piece of metal with such force its atomic structure undergoes substantial alteration, and its properties change

ELECTRONIC work-hardening of metals may be a routine matter in metalworking plants in the near future thanks to experiments conducted by four technicians at the atomic energy development laboratory in the Downey plant of North American Aviation. Headed by Dr. Donald Eggen, physicist in charge, Dr. Norman Huston, C. J. Thompson and Harry Irmsher developed an electronic "hammer" called the Statitron, also called a Van de Graaf generator after the inventor of the original.

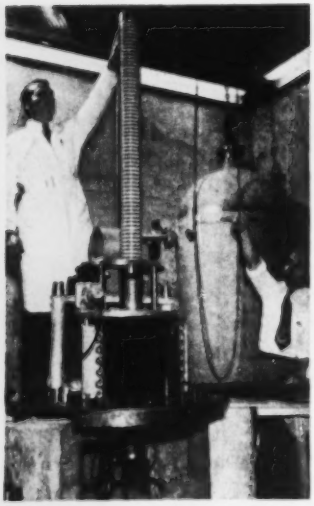
Unlike the Cyclotron, the Statitron does not smash atoms. It displaces them and thus is capable of changing the physical properties of a piece of metal. An endless insulated belt traveling at 3000 fpm conveys electrons up to the top of the Statitron where they are stored on the metallic dome, building up a tremendous charge accumulation.

When released by a hot filament, the accumulation gains speed down an evacuated accelerator tube. About 60 thousand billion electrons per second strike the experimental target at the base of the tube. Their speed of travel is approximately that of light—186,000 miles per second. The electronic energy smashes against the piece of metal with such terrific impact that the energy is transmitted to the atoms making up the piece of metal. They are hit with such force they are displaced.

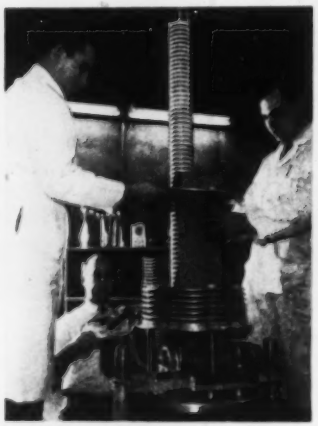
Statitron produces no radioactivity but does produce a very dangerous radiation background of several million times what is considered tolerance for the human body. These radiations are very hard x-rays capable of taking interior pictures of very heavy steel samples—a piece 2 feet in diameter. For this reason walls in the Statitron room are thick concrete and the door is heavy lead. Building is electrically interlocked making it impossible for the generator to be turned on when anyone is in the room.



Schematic diagram of the Downey Statitron, atomic displacer that will change physical properties of metal



Stripped down Statitron showing ribbed, evacuated accelerator tube which conveys electrons to target

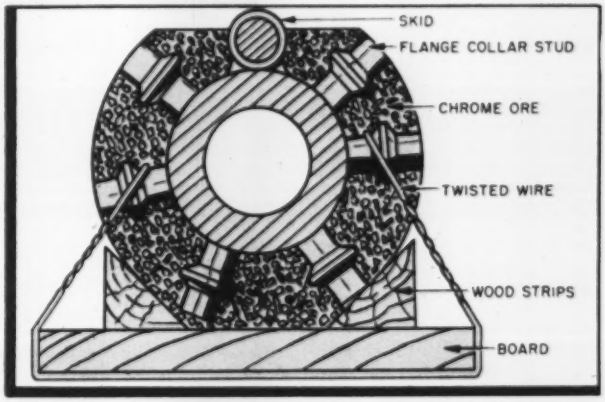


Equipotential rings are placed around the accelerator tube, and over insulated endless electron conveyor belt

Final accelerator that contains the auxiliary high voltage mechanism is placed in position on the Stratitron

INSULATION LENGTHENS Skid Tube Life

Collar studs gun-welded to skid tubes and support pipes in reheat furnaces permits close packing, better adherence of chrome ore insulation



Cross-section diagram showing how skid tubes and support pipes are insulated with chrome ore that is held in place by gun-welded collar studs

By ROBERT C. SINGLETON
Nelson Stud Welding Division
Gregory Industries Inc.
Lorain, O.

WATER-COOLING of skid tubes and supporting structure in reheat furnaces poses problems. Circulation of pressurized cooling water through bare tubes takes away furnace heat and increases slab heating time. Tubes cause local cold spots on billets necessitating a soaking period to bring them to uniform temperature. With constant exposure to the oxidizing effect of the furnace flame, tubes scale inside and outside. Hot spots and early tube failure result.

While the obvious answer is to insulate skid tubes, the big question has been how? First efforts in which chrome ore insulating material was held in place by hand-welded plain studs, were not successful. Material did not hold well to plain studs, and where it fell away, hot spots developed.

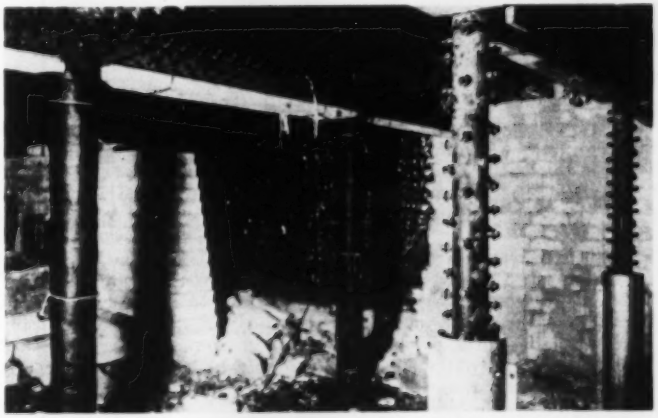
Then studs with threaded ends were tried. A nut was attached to the end to aid in holding the chrome ore insulation. Big disadvantage was the time required to attach nuts to each stud. That objection is removed by a recent development—a gun welded stud with an integral collar that holds the refractory. Gun welding speeds application of the studs, and skid tubes are ready for the insulation immediately.

Saves Heat — Insulated skid tubes, crossovers and uprights decrease furnace heat loss 20 to 25 per cent. One mill operator reports insulating skid tubes and supports, and adjusting the heat cycle lowers stack temperature 400° F.

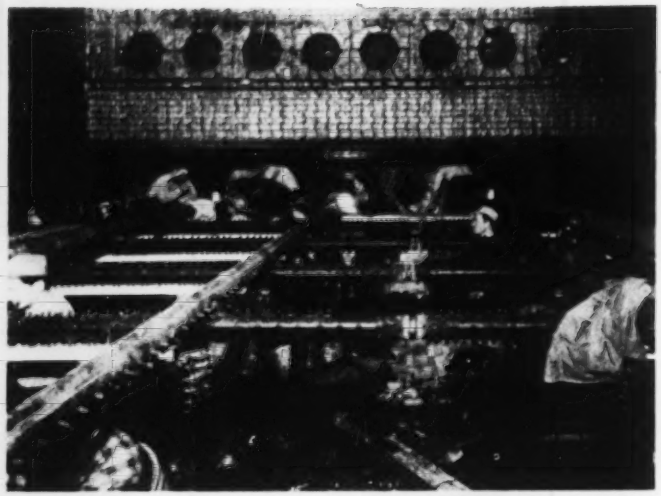
Cold spots on the skids are eliminated and so is the soaking period required to remove them. Cooling water temperature is lower, reducing internal scaling. External corrosion is lessened by insulating material. Net result is less maintenance and shorter downtime, increased tonnage per reheat furnace. Cost per ton of steel processed is lower.

Before welding on collar studs, all tubes should be clean and free from scale. Studs are welded to tubes on approximately 2¾-inch centers, staggered. Gun will apply three to five studs per minute. No studs are placed at points where skid tubes contact crossovers. Chrome ore is also omitted at these points to allow for pipe expansion.

Boards about 1 inch thick and



Partially completed installation. Vertical pipes at left were insulated, wrapped with burlap. Sheet-steel forms on pipes at right aid in placing chrome ore



End view of furnace showing skid tubes with collar studs attached. Boards are being placed under horizontals prior to packing with refractory material

about 2 inches wider than diameter of the insulated pipe are wired on the underside of horizontal tubes. Wire should be no more than 2 feet apart and should be twisted tight to restrict movement of board during application of the chrome ore.

Ore is pressed firmly between lower studs with small, stiff trowels, then rammed between studs with a flat-nosed stick. If ore shows a tendency to sag from the lower part of the pipe before air-set occurs, 45-degree wood strips may be applied as indicated in drawing. Refractory material should set for two hours, then it is ready for venting with a carpenters awl. Vent holes should be about 1 inch apart and should penetrate the full depth of insulation.

Vertical support members are insulated by applying the chrome ore at the base of the pipe and working upward. Ore is packed flush with the end of the studs, but not beyond. To prevent possible sagging, each pipe should be wrapped with 4 or 5-inch strips of cloth or tough felt roofing paper as the insulation is completed. Wires wrapped around the cloth strips secure them tightly.

When insulation is complete, temperature of the furnace is brought up in the usual manner. Direct flame impingement on the insulated pipes should be avoided during the early stages of warm-up. Boards, wires and wrappings burn off and are not removed prior to warming up.

Helical Inserts Speed Bolster Plate Thread Repairs for Stewart-Warner

HELICAL-WIRE thread inserts speed repair of worn and stripped bolster-plate threads in machine shops of Stewart-Warner Corp., Chicago. Company estimates place time savings at more than 80 per cent.

In addition to reduction of down time on 200 punch presses in these shops, wire-insert method of thread repair is 60 per cent cheaper and provides stronger replacement threads, more resistant to wear and corrosion than the original tapped threads. Thread inserts used in this method are precision-formed coils made from stainless-steel wire of diamond-shaped cross-section.

Of thread-repair techniques in use, wire-insert method is considered to be most efficient in its saving of time, labor, materials, and most effective in producing a permanently-repaired thread. Over-size-thread method is considered undesirable because the need for using larger and more expensive bolts. Since 95 per cent of bolster-plate holes have $\frac{7}{8}$-11 tapped threads, repair operations require next larger size, $\frac{3}{4}$-10. While this is acceptable, any further wear requiring another repair operation necessitates an increase to the $\frac{7}{8}$-9 thread size which would be prohibitive. Following this method requires increasingly larger size bolts.

Another technique, the solid-bushing method, is satisfactory except for excessive "down-time" involved. Experience has shown this method of repairing takes more than an hour per thread against conservative estimate of 10 minutes required to repair one bolster-plate thread with a thread insert.

For the past two years, company has produced durable replacement threads quickly and economically by utilizing the wire-insert method.

After bolster plate is properly positioned in a drill press, the badly worn $\frac{7}{8}$-11 thread is cleaned out with a 21/32-in. drill. Retapping is accomplished with a $\frac{7}{8}$-11 Heli-Coil tap. Tap sizes are keyed with the original thread size to speed and simplify identification.

After tapping, a $\frac{7}{8}$-11 Heli-Coil thread insert is installed with an inserting tool, and is positioned so top coil is one-half turn below the surface of the plate. Because this is a through hole, inserting tang—an extension of the lead coil bent inward along a diameter to engage the slot in inserting tool—must be broken off after the insert is installed. This is accomplished with a tang break-off tool. On blind holes, tang is left intact because inserts for this type of hole are specified to lengths prohibiting interference between bolt and tang.

During two years, over 600 inserts have been installed, or an average of three inserts per bolster-plate. Most of these have been for $\frac{7}{8}$-11 threads. Method has also been used to recondition $\frac{3}{4}$-10 threads. No insert has ever stripped, pulled out, or shown any visible deterioration.

BUSINESS IN MOTION

To our Colleagues in American Business . . .

For several years this space has been used to tell how Revere has collaborated with its customers, to mutual benefit. Now we want to talk about the way our customers can help us, again to mutual benefit. The subject is scrap. This is so important that a goodly number of Revere men, salesmen and others, have been assigned to urge customers to ship back to our mills the scrap generated from our mill products, such as sheet and strip, rod and bar, tube, plate, and so on. Probably few people realize it, but the copper and brass industry obtains about 30% of its metal requirements from scrap. In these days when copper is in such short supply, the importance of adequate supplies of scrap is greater than ever. We need scrap, our industry needs scrap, our country needs it promptly.

Scrap comes from many different sources, and in varying amounts. A company making screw-machine products may find that the finished parts weigh only about 50% as much as the original bar or rod. The turnings are valuable, and should be sold back to the mill. Firms who stamp parts out of strip have been materially helped in many cases by the Revere Technical Advisory Service, which delights in working out specifications as to dimensions in order to minimize the weight of trimmings; nevertheless, such manufacturing operations inevitably produce scrap. Revere needs it. Only by obtaining scrap can Revere, along with the other companies in the copper and brass business, do the utmost possible in filling orders. You see, scrap helps us help you.

In seeking copper and brass scrap we cannot appeal to the general public, nor, for that matter, to the small businesses, important though they are, which have only a few hundred pounds or so to dispose of at a time. Scrap in small amounts is taken by dealers, who perform a valuable service in collecting and sorting it, and making it available in large quantities to the mills. Revere, which ships large tonnages of mill products to important manufacturers, seeks from them in return the scrap that is generated, which runs into big figures of segregated or classified scrap, ready to be melted down and processed so that more tons of finished mill products can be provided.

So Revere, in your own interest, urges you to give some extra thought to the matter of scrap. The more you can help us in this respect, the more we can help you. When a Revere salesman calls and inquires about scrap, may we ask you to give him your cooperation? In fact, we would like to say that it would be in your own interest to give special thought at this time to all kinds of scrap. No matter what materials you buy, the chances are that some portions of them, whether trimmings or rejects, do not find their way into your finished products. Let's all see that everything that can be re-used or re-processed is turned back quickly into the appropriate channels and thus returned to our national sources of supply, for the protection of us all.

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Worn Bearing Surfaces Reclaimed

Electrolytic process reactivates cylinders, liners by building up worn down bearing surfaces to standard dimensions with a hard, dense, corrosion-resistant alloy coating

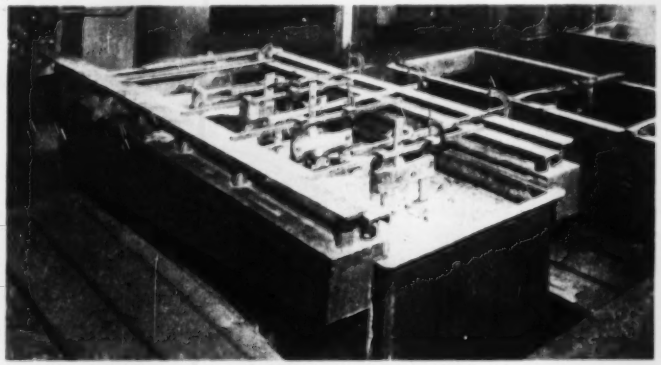
EXPANDED facilities are in the offing for Spar-Tan Engineering Co., Los Angeles, when the company completes its present program. Capacity of the plant will be doubled, and will make available to West Coast industry both the Vanderloy M and Porus-Krome processes licensed by Van der Horst Corp., Olean, N. Y.

Both processes build up worn bearing surfaces electrolytically. Application of Porus-Krome builds a dense, hard wearing and corrosion-resistant chromium on working surface. Surface of coating is said to have tiny pores that retain oil and aid lubrication. Aircraft engine cylinders are being reclaimed with this material.

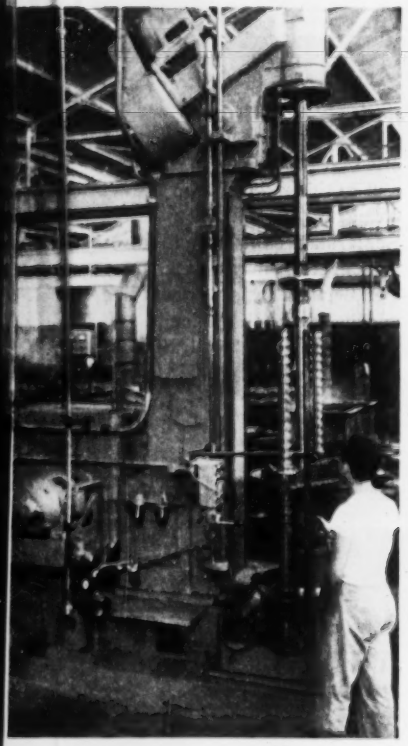
When Vanderloy M is applied, a coating of electrolytic iron of any thickness can be plated on the base metal. Tensile strength of material is said to be 75,000 psi, Brinnell hardness, 200-210. Though having a tendency to be tough, material can be cut with high speed steel cutters.

Worn aircraft cylinders first get preground to relief dimensions, then built up to dimensional accuracy electrolytically. Upon immersion in electrolytic tanks they are subjected to high amperage-low voltage current which breaks down the electrolyte to bond pure chromium to the bore surface.

After plating, pieces get a finish-honing, then are vapor blasted to remove any remaining abrasive.

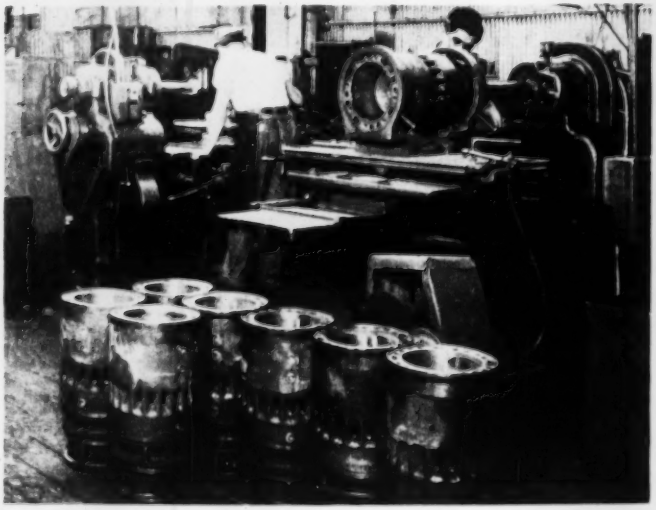


Aircraft cylinders are suspended by fixtures in plating tank for building back to size by electrolytic application of hard, corrosion-resistant chromium coating



Honing liners at Spar-Tan Engineering Co. to produce proper surface for application of Porus-Krome coating

Pregrinding of the wearing surface to relief dimensions is standard procedure before electrolytic process brings piece to standard dimensions



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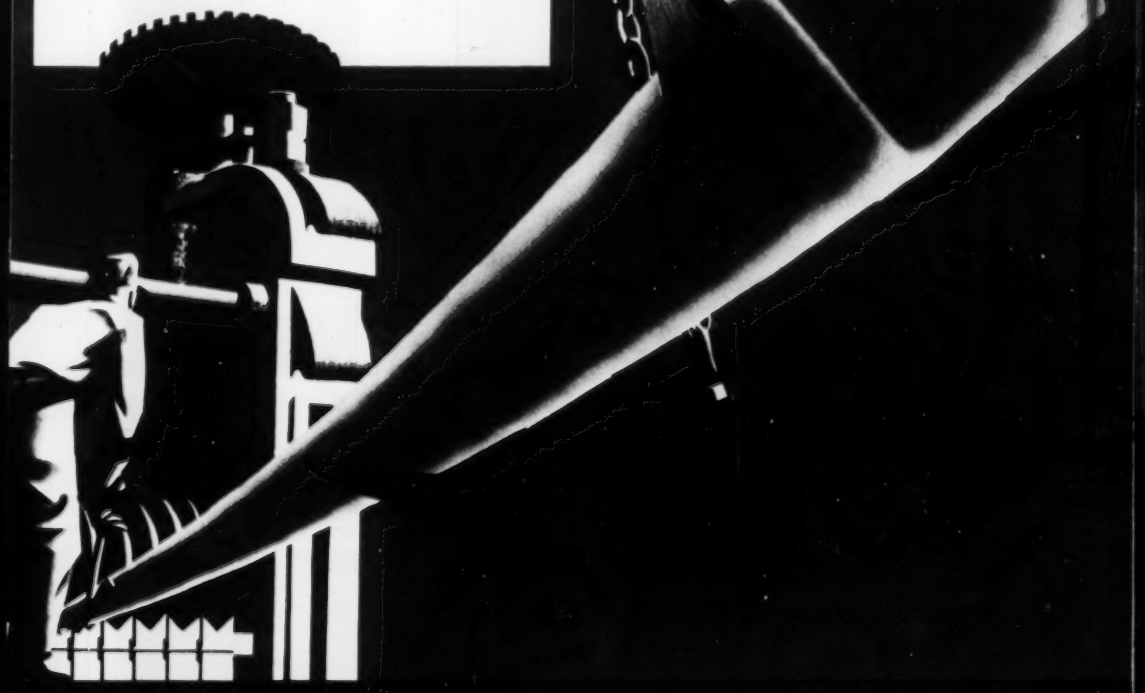

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Punching 150 holes ranging from .078 inch to .250 inch in size at one time, is a job easily done on Cleveland Steelwelds.

Clearance between punch and die illustrated, was held to .0015 inch to avoid burrs. The punches are individually gagged and gauged, with built-in strippers, set to accurate scale readings and as close as ¾-inch centers.

For supporting the sheets during punching, this machine is provided with a special table and micrometer gauge which is operated by a handle at front of press just below top of bed.

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Alloy Conservation: Boron Fills the Bill

Shortages of alloying elements make it necessary for consumers to understand advantages and limitations of available steels. Proper treatment overcomes many problems

By ALEXANDER H. d'ARCAMBAL
Vice President & General Sales Manager
Pratt & Whitney
Division Niles-Bement-Pond Co.
West Hartford, Conn.

THE ALLOY situation today is more critical than at any time during World War II. We are faced with a critical shortage of nickel, molybdenum, tungsten, cobalt, columbium and possibly manganese and chromium at a later date. We find it necessary to import much of the manganese ore used in this country. Last year we imported approximately 2 million tons of manganese ore.

Manganese ore is found in forty countries in varying quantities but it is regretted that by far the largest deposits are in Russia so you can see the seriousness of this situation, especially if an all-out war develops and submarine warfare interferes with shipping. In regard to chromium, there is very little chromium ore in this country.

Only bright spot today is vanadium. During World War II there was a critical shortage of vanadium. It was practically impossible during that period to obtain alloy steels containing vanadium such as SAE 6100 series. The greater abundance of vanadium today is due to the fact that vanadium is a by-product of the atomic energy program. Vanadium is associated with uranium ores.

Critical shortage of alloying elements today is due principally to the following: 1. More steel is being produced today than at any time in the past; 2. increased demand by the military for alloy steels, 3. the jet engine program.

Boron's the Answer — What is the answer to this very serious problem regarding the shortage of the important steel alloying elements? The answer as far as we can see today is the use of boron treated steels.

Boron steel is produced by adding boron to the ladle, the boron carrying agent being one of many types such as the complex deoxidizers, grainal being a good example, as well as ferroboron, borosil, etc. There is only about one-half of 1 per cent boron in grainal No. 79, together with manganese, aluminum, titanium, silicon, zirconium and iron. Where grainal No. 79 is used about 4 pounds to a ton of steel is added for the medium and high carbon steels. In the case of the low carbon steels somewhat more than 4 pounds of grainal No. 79 is added to a ton of steel, which is also true of electric steels. For steels running about 0.30 per cent carbon or higher the amount of boron in the finished product is only about one thousandth of one per cent. For the lower carbon steels boron may run as high as 0.003 to 0.005 per cent.

Boron has only one function and that is to increase the hardenability of steel by greatly intensifying the degree of hardenability of the alloying elements present, such as manganese, nickel, molybdenum, etc. These alloying elements that contribute to hardenability must be present in the steel for the boron to be effective. But the percentage of these alloys is much lower than in steels without boron, thus conserving the critical alloying elements.

With so little boron in the steel, it is of course most difficult to determine the percentage of it except by spectroscopic analysis. Many of the companies using boron steels do not attempt to determine the amount of boron in the steel, merely using the Jominy hardenability test on all incoming shipments, as hardenability is what we are interested in.

Hardenability Defined—Hardenability is the ease of hardening or the ability of steel to harden. "Hardness", as differentiated from "hardenability", is a function of the carbon content irrespective of the alloys present. The degree of Rockwell hardness is dependent upon the percentage of carbon present. The speed of quenching required to produce the desired hardness on the other hand is dependent on the hardenability of steel.

Machining as well as welding qualities of boron steels are as

GOOD NEIGHBOR: A steel booth built by the welder shields an operation that was a safety hazard and a source of annoying glare to co-workers. Shield fits over gun tubes while a half ring welded to one end facilitates suspension in vertical furnace for heat treating. Tubes are turned out at National Supply Co., Torrance, Calif. ←

PIPE SPECIAL: Welded stainless steel pipe up to 40 inches diameter is produced by this special Heliarc welder at Standard Steel Corp., Los Angeles. Protective coating on inner surface prevents contamination. Weld is uniform, high quality and has greater strength than other pipe sections. Company makes 100 tons per month →

satisfactory as similar analysis steels without boron. The physical properties including impact values also are comparable to steels without boron. These physical tests have been run on boron steels quenched and drawn to a Brinell hardness ranging from 200 to 400, the steel first being fully quenched resulting in at least 90 per cent martensite being present in the as-quenched condition. To obtain the proper effect of boron, the steels must be properly quenched and drawn as the only effect of boron is to increase steel's hardenability.

Disadvantages, Too — Here are some of the disadvantages and limitations of boron steels.

Too high a percentage of boron in the steel causes hot shortness and brittleness. Considering the fairly large tonnage of boron steels that has been produced by the steel mills in this country during recent years, however, we feel confident that very little trouble will be experienced due to boron treated steels having too high a percentage of boron. Prior to this year close to 400,000 tons of boron steel were melted. This year alone well over a million tons of boron steels will be produced, a large tonnage of which is for military uses. Our steel mills claim today that they have no more difficulty in manufacturing boron steels than other types of steels, taking precaution to make sure that the boron addition is made to the steel which has been fully deoxidized.

Effect of boron in regard to hardenability decreases with increased carbon content. Boron has the greatest effect on the low carbon steels, this effect decreasing as the carbon content is increased up to the point of about 0.90 per cent carbon where the boron has little if any effect on the hardenability of the material. This means that some trouble may be experienced with obtaining the desired case hardness on boron-treated carburizing steels especially in the larger sections since carbon content in the exterior of the case usually runs 1 per cent or higher. This can be partly overcome by using the diffusion cycle when gas carburizing, as well as employing a very drastic quench with proper quenching fixtures when hardening.

Cold Treatment—On either the old type of fairly highly alloyed carburizing steels, or in the case of some boron treated carburizing steels, considerable retained austenite is present in the case after quenching, especially where the carbon content of the case is higher than usually obtained. By giving such parts the cold treatment, that is, bringing them down to −100°F to −120°F retained austenite is transformed to martensite with resultant increase in the case hardness as martensite is considerably harder than austenite. This cold treatment has been used for years on some types of carburized parts to bring the finished product up to the desired Rockwell hardness when conditions above outlined are present.

Cold treatment while beneficial for certain types of alloy carburizing steels where the carbon content of the case is high is of no benefit whatsoever when applied to high speed steel cutting tools as far as improving cutting life is concerned.

Cold treatment at temperatures −100°F to −120°F is being used daily by many companies for the seasoning of products where dimensional stability is desired, shrink fits, etc., with excellent results, so there is a definite and increasing demand for these cold units for suitable applications such as above described.

PATTERN FOR TIMESAVING: Use of carbon paper to make router patterns saves about 50 manhours a week in the plating section of Texas Engineering & Mfg. Co. Inc., Dallas. One tracing of the template with alternate pieces of pattern and heavy carbon makes 12 absolutely identical copies

What About Warpage?—Considerable warpage has been experienced by some companies with parts made of boron treated carburizing steels due to the increased hardness of the core, which of course is low carbon and therefore benefits to the maximum from the boron addition as far as hardenability is concerned. Some consideration should be given to lowering the carbon content of some of the boron-treated carburizing steels, at the same time increasing the chromium content. This should give a greater case hardness, the lower carbon content being beneficial as far as keeping the core down to the desired hardness.

Some investigators report that the direct hardening boron steels such as the medium carbon steels, require somewhat higher temperatures for hardening, possibly 25° F, than steels without boron. This may result in somewhat greater distortion but in such cases martempering is recommended. Quenching in the hot both minimizes distortion and at times gives increased physical properties as well as of course reducing the hazard of cracking during quenching.

Some users have reported temper brittleness with certain types of boron steels when tempering to 1000° F or higher after hardening. This may or may not be true but it is our recommendation that where the high drawing temperature is used the parts be oil quenched when removed from the drawing furnace, instead of air cooled.

Everybody's Using It—Several large manufacturing companies use boron steels on a tonnage basis with excellent results. The tank, automotive, farm implement and aircraft industries are well on their way to establishing acceptable grades in boron treated steels. It is important that the vital machine tool industry conduct the necessary experiments and research at the earliest possible date so they will be prepared for this change in the steel situation which is right around the corner.

From data presented by the author at the 50th annual meeting, National Machine Tool Builders Association.

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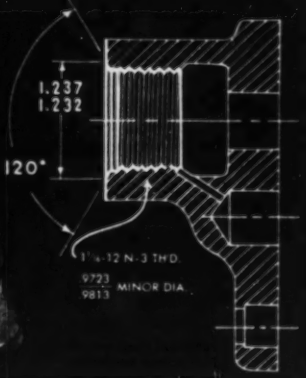

Five precision-operations are specified on these aluminum alloy Auxiliary Pump bodies for Jet Aircraft Engines.

Producing this work to difficult "aircraft-quality" standards presented no problem to Chandler-Evans' tool engineers:

They simply tooled up a P&J 3U AUTOMATIC — including a P&W Precision Ground Thread Tap and the P&J Automatic Tapping Control unit you see mounted on the top of the machine (a combination which easily maintains the required close tolerances for a Class 3 thread on a long production run)

— and machined these castings well within the unusually high-precision limits insisted upon by the Aircraft Industry

— in the record floor-to-floor time of 2 minutes flat!

Operations

as indicated by heavy lines in the drawing:
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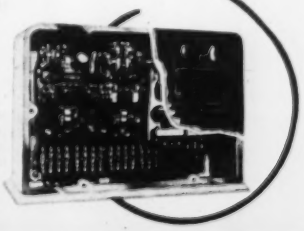
2nd — FACE
3rd — BORE
4th — C'BORE, C'SINK
5th — TAP

Production-tapping for Class 3 thread is accomplished by means of this P&J-designed Automatic Tapping Control Unit.



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Mold Sand Mixes Electronically Weighed and Controlled

Steel casting quality improved by systems that can apportion three types of sand with great accuracy on an around-the-clock basis. Interlocks assure proper operation

AUTOMATIC method of electronic weighing and control of mold sand mixes, new to foundry operation, has been adopted at the Granite City, Ill., plant of General Steel Castings Corp. It assures accuracy and reproducibility essential in sand molds for producing highest quality steel castings. A strip chart recorder provides a continuous check on the accuracy of sand proportions.

Use of the method increases production of milled sand about 15 per cent and greatly improves consistency of physical properties of mold sand. In terms of standard foundry laboratory test indexes, sand with a moisture of 3.4 to 3.8 per cent is held to a green strength of 6.5 to 7 psi and a permeability of 165 to 195. Weight accuracy is near 1 per cent for an 1800-pound batch regardless of moisture content, height of sand in bin or cleanliness of conveyor.

Two Sand Types—First of four installations of automatic control through Baldwin SR-4 load cells is batching two types of sand every 2 minutes, 24 hours a day since March 1950. All four systems are set up to apportion three types of sand when required. More can be added if and when required.

Each skip bucket rests on a steel platform suspended from three 2000-pound SR-4 tension type load cells. Notched plates on the bottom of the bucket guide the bucket onto inverted angles, freeing bucket wheels from vertical channel tracks on which it is raised and lowered between platform and sand muller. A limit switch on one side of the bucket prevents start of the filling cycle until the bucket is in place.

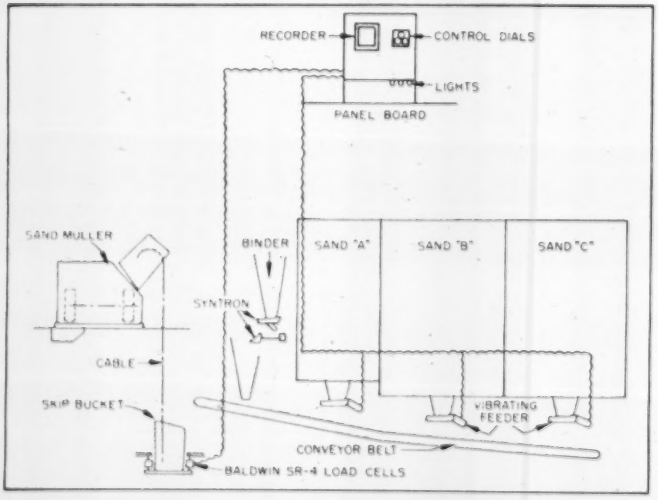
Two other interlocks also assure proper operation. If more than 30 pounds of sand remain in the bucket from the previous mix the program will not begin. And if the sand supply in any bin is not enough for the mix the skip bucket cannot be hoisted.

Load cells are protected against impact overloads by springs and oak shear pins in the platform suspensions. Such impacts might result if the lifting cable should break. Springs also absorb lesser impacts when the empty bucket returns to the platform.

Controlled Cycle—Although sand mills and skip bucket lifts are still manually operated by pushbuttons, automatic equipment which will control the complete cycle automatically is to be installed. This is expected to increase production further and will put sand control in the hands of a skilled supervisor who can apply precision methods in quality control of mold sands.

Control dials on the panel board are set for the quantity of sand to be fed by vibrators on sand bins onto the conveyor belt. These dials may be set in 20-pound increments up to 3000 pounds. Panel board lights indicate which sand is being fed.

When the operator pushes the starter button the predetermined amount of sand A is delivered into the bucket. Twenty seconds after the vibrating feeder stops, sand B starts to feed. Twenty seconds after the second feeder stops a signal light at the sand mill tells the operator that the bucket can be raised. The binding materials are automatically measured and added independently whenever convenient before raising the bucket. If the equipment has functioned properly the load cells permit the bucket to raise when the operator pushes the proper button.



Schematic diagram shows the mold sand handling and proportioning system. Skip bucket on Baldwin SR-4 load cells (lower left) receives sand from conveyor belt passing under bins and binder hopper. Control dials on the panel board measure sand quantities released by vibrating feeders in 20 second intervals

Coatings Resist Abrasion

New hard coatings for aluminum where high resistance to abrasion is desired are being released to licensees by Aluminum Co. of America, Pittsburgh. These coatings have special value where hard, long-wearing surfaces coupled with light weight are essential, as in surfaces subjected to abrasion or erosion.

The new wear-resistant finishes are anodic oxide coatings which form an integral part of the metal they protect. Intrinsically hard, aluminum oxide coatings cannot be chipped or flaked from their parent metal, and the newer types afford superior resistance to abrasive action.

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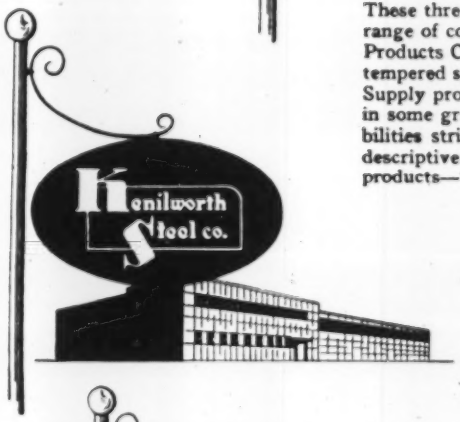
These three steel warehouses normally carry in stock the complete range of cold rolled strip steel specialties made by The Cold Metal Products Company, including low carbon and high carbon analyses, tempered spring steel and stainless grades in the 300 and 400 series. Supply problems are now very difficult. Currently, shortages exist in some grades and sizes, but within the limits of inventory possibilities strip steel fabricators continue to find justification for the descriptive phrase long identifying all Precision produced CMP products—"More feet per pound—more finished parts per ton."



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Blast Furnace Practice

VI(a) Generation, Recovery and Use of Heat

By CHARLES E. AGNEW
Consultant
Blast Furnace and Sintering Plant Operation
Cleveland

Many operators have overstressed the importance of the carbon solution loss reaction to the fuel economy. Explanation shows why Gruner's theory is impossible to attain

CARBON charged into the blast furnace serves the dual purpose of supplying heat and acting as a reducing agent for oxides. All carbon gasified in furnace operation will exist in top gas substantially as carbon monoxide (CO) and carbon dioxide (CO_2), and an occasional minor content of methane (CH_4). Combustion of carbon to the respective oxides generates heat but qualified reference authorities differ slightly in the respective amounts generated. These slight differences are not important to the blast furnace operator; he is more concerned with the relation to each other of the respective divisions of thermal work, and in pounds of fuel consumed for the purpose. Use of a thermal balance is the only means for illustrating this relation of thermal work and while it does not serve any useful purpose in the daily direction of furnace operation, its use in the study of furnace operating principles is indispensable.

Because all thermochemical reactions in blast furnace operation have not been determined with absolute exactness, assumptions must be made for some of them when calculating a thermal balance. For many years the calculation procedure commonly considered:

1. That heat production came from the combustion of carbon to carbon monoxide ($C + O = CO$) and to carbon dioxide ($C + O_2 = CO_2$), or carbon monoxide to carbon dioxide ($CO + O = CO_2$).

2. That all carbon dioxide contained in the top gas, minus the amount evolved from the stock, generated the maximum amount of heat from the combustion of C to CO_2.

3. That the reduction of iron (Fe) from the oxide was an endothermic reaction and consumed heat.

With these assumptions the volume of heat generated from the combustion of C to CO_2 virtually balanced the volume consumed by reduction of iron, and indication of heat consumption by other divisions of work was not affected.

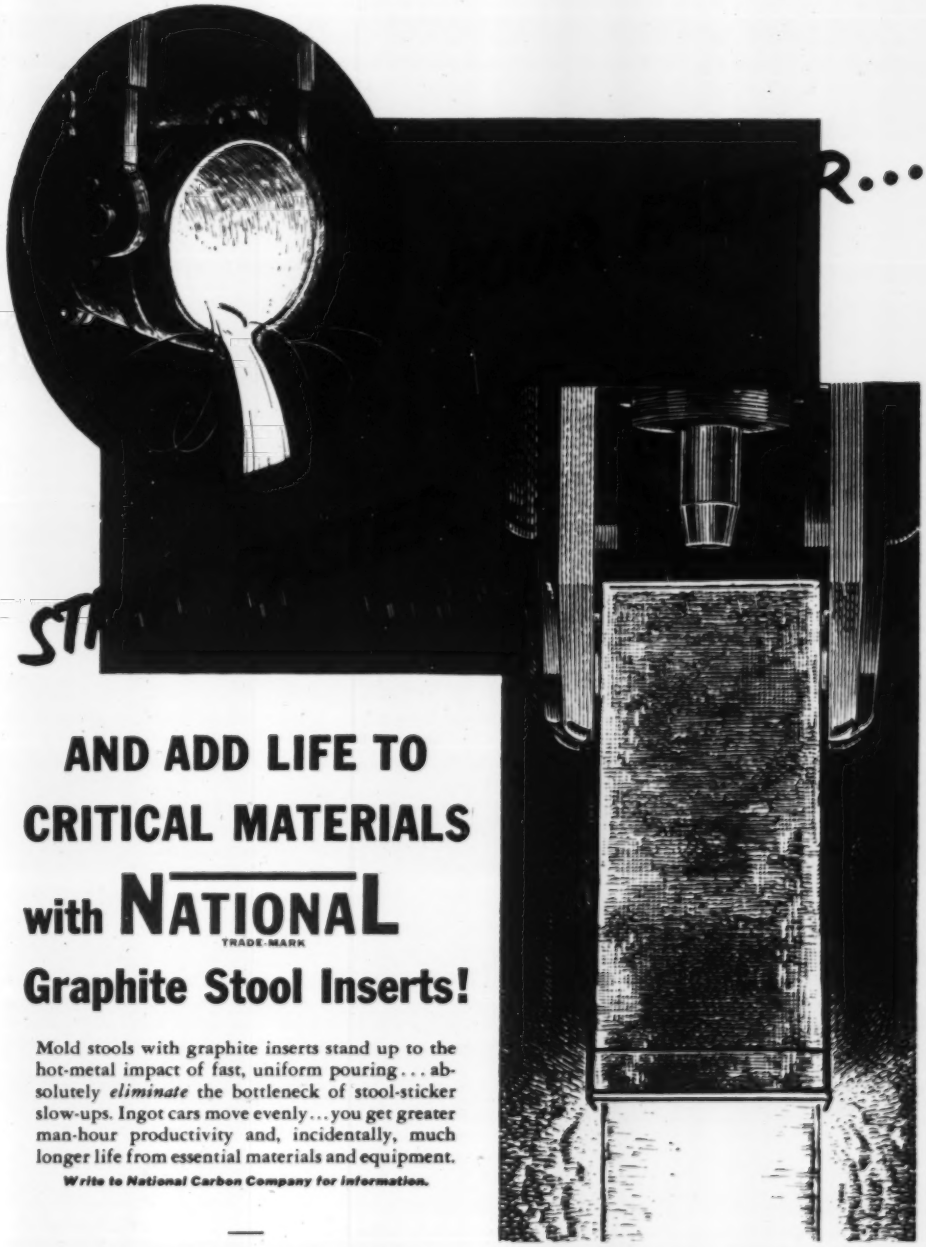
Advocate New Procedure—Joseph and Neustaetter[4] claim the assumptions for the "old" procedure are not consistent with the thermochemistry of the operation and they advocate the use of a new procedure with which the only heat generated comes from the combustion of carbon to carbon monoxide, from deposition of carbon, and from exothermic reaction of iron oxide reduction. Also, the new procedure uses rates of heat consumption different from the old for reduction of silicon, manganese and phosphorus, and for dissociation of water vapor. The old procedure does not give any consideration to the carbon solution loss while the new considers it a major item of heat consumption.

Necessarily these departures in calculation procedure cause wide differences in the measurement of the volume of heat generated and consumed, but they do not alter the pounds of fuel charged to the furnace in any operation under study, or disturb the illustration of other divisions of thermal work.

In 1947 the writer[5] made an analysis of thermal requirements of different classes of iron bearing materials, using for illustration the thermal balances prepared, (1) by United States Bureau of Mines[2] for a furnace using Southern ores, (2) by Walter Mathesius[6] for a Northern furnace using Lake ore, and (3) by the writer for an Eastern furnace using sintered iron ore concentrates and other volatile free iron-bearing materials for the furnace burden. The "old" calculation procedure was used for these three thermal balances. The procedure advocated by Joseph and Neustaetter gives opportunity for comparison of the carbon solution loss reaction which the old procedure ignored. The calculations are based on data in Table VI.

Tabulated Data Important—Particular attention is called to the items of heat distribution (Table VIII) indicating the volume of heat consumed by the gangue products and by the iron product. They emphasize the importance of raw material chemical composition to fuel economy in furnace operation, not only with regard to the pounds of gangue products in relation to the iron product but also with regard to the ratio of the gangue constituents to each other as they affect the efficient use of heat.

Attention is directed to the "carbon solution loss". In recent



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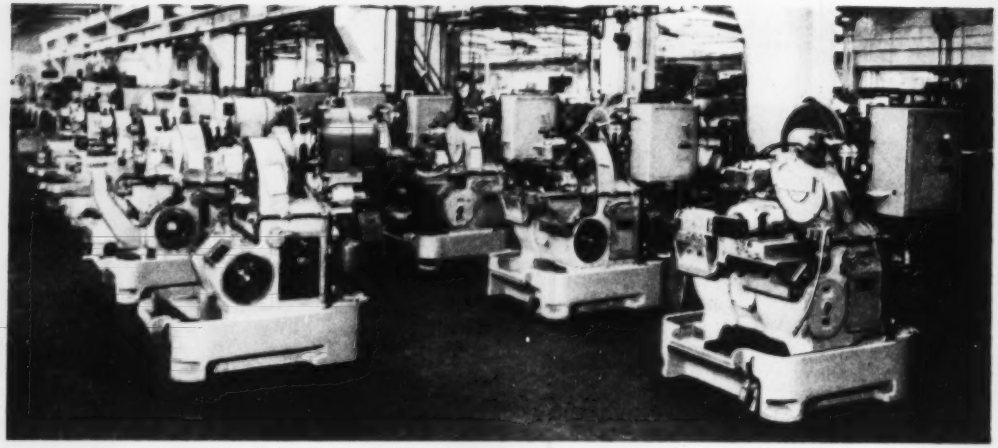

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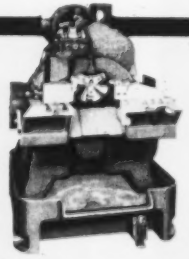
AND HERE'S THE JOB

PART	Cast-iron Cap
SIZE	$6\frac{5}{8}$" Diameter
OPERATIONS	5
TOOLS	Carbide-tipped
MACHINE TIME	35 Seconds
PRODUCTION	Five Times Former (Hand Machine) Method

—AND HERE'S THE MACHINE—



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years this item has been stressed by numerous commentators because of the assumed advantage to furnace thermal economy if the potential heat lost through the reaction could be generated by the combustion of the carbon at the tuyeres. This assumption is open to question. The calculation indicates the pounds of carbon lost to solution in the three furnace operations of Table VIII are as follows:

(Per 1 gross ton of iron)

	Dry Coke		
	South	North	East
Charged, lb	2485	1643	1309
Fixed Carbon, lb.	2111	1462	1178
	Carbon		
To solution, lb	218.52	125.38	226.49
To solution, %	10.35	8.57	19.22

Since the three calculations are based upon data from actual furnace operations, and East has the largest weight and percentage of carbon lost, but at the same time the lowest fuel rate, it appears that the importance of the solution loss reaction to the fuel economy has been overstressed. The reaction, however, is not objectionable in itself and may be considered an advantage when other phases of furnace operation permit the use of high blast temperature.

In 1874 Gruner[7] advanced the theory that in ideal blast furnace operation all carbon burned in the furnace would be oxidized to CO at the tuyeres, and all reduction of oxides above the tuyeres should be caused by CO which then would become CO_2. The theory was based on the premise that with such conditions the theoretical maximum amount of heat would be generated from carbon combustion.

Gruner's ideal cannot be attained in actual furnace operation because it does not recognize the existence of other principles of blast furnace operation which preclude any possibility of its attainment, as well as the need for other thermochemical reactions which are just as vital to the operation as the generation of heat.

Weights are Different—In every blast furnace operation there is difference between the weight of coke carbon charged to the furnace and the weight of coke carbon which appears in top gas. Pig iron cast from the blast furnace is saturated with carbon which has been absorbed from the coke, the saturation percentage varying with the chemical composition of the iron specified. Some solid carbon also will be taken from the furnace with the flue dust. Aside from these amounts all carbon charged into the furnace will be gasified. The difference between the weight of coke carbon which appears in the top gas and the weight which is gasified at the tuyeres is commonly referred to as carbon consumed above the tuyeres. Consumption occurs in two ways:

1. Research[2] proved that silicon, manganese and phosphorus are re-

TABLE VI
MATERIALS CHARGED INTO FURNACE TO PRODUCE 2340 LB OF IRON

	Lb of Material		
	South	North	East
Ore	4,203.60	4,057.00	3,450.00
Scrap	328.98	36.00	350.00
Limestone	1,253.11	795.00	300.00
Coke	2,626.85	1,682.00	1,350.00
Blast (excluding moisture)	9,627.88	6,643.00	4,548.00
Moisture in blast	67.92	99.00	47.60
	18,108.34	13,313.00	10,045.60
Data on Material Charged			
Average iron content of ore	43.28	51.19	54.55
Average iron content of ore and scrap	48.31	51.22	57.35
Fluxing stone	Dolomite	Not known	Calcite
Burden ratios:			
Ore to coke	1.60/1.00	2.41/1.00	2.55/1.00
Ore and scrap to coke	1.73/1.00	2.44/1.00	2.78/1.00
Ore, scrap and stone to coke	2.20/1.00	2.91/1.00	3.00/1.00
Coke analyses (dry):	Per cent		
Volatile matter	0.49*	1.35	0.50
Fixed carbon	84.93	89.00	90.00
Ash	13.48	9.40	8.65
Sulphur	1.07	0.59	0.85
	99.97	100.34	100.00
Moisture, %	5.49	2.30	3.00
Temperature of blast, ° F	957	1248	1550
Temperature of top gas, ° F	335	325	350
Blast moisture, grains/cu ft	3.73	5.49	5.49

* Adjusted from natural as reported in technical paper No. 391.

TABLE VII
MATERIALS DISCHARGED FROM FURNACE PER 2340 LB OF IRON

	Lb of Material		
	South	North	East
Pig iron	2,240.00	2,240.00	2,240.00
Scrap	none	22.00	67.00
Slag	1,786.47	1,010.00	898.00
Flue dust	277.86	89.00	90.00
Gas (excluding moisture)	13,244.89	9,359.00	6,622.00
Moisture in gas	559.12	603.00	106.00
	18,108.34	13,314.00	10,023.00
Data on Material Discharged			
Yield of pig iron and scrap, %	49.41	55.26	60.71
Pig iron analyses:	Per Cent		
Silicon	2.01	1.35	1.00
Sulphur	0.044	0.032	0.030
Phosphorous	0.603	0.071	0.300
Manganese	0.722	0.74	1.50
Carbon	3.60	4.20	4.00
Iron	93.02	93.61	93.17
	100.00	100.00	100.00
Slag analyses:			
Silica	32.15	slag	35.03
Alumina	16.23	analysis	14.51
Lime	32.29	not	42.99
Magnesia	15.88	known	4.52
Sulphur	1.41		1.78
Misc.	2.04		1.17
	100.00		100.00
Gas analyses, by volume:			
Carbon monoxide	30.04	23.50	28.00
Carbon dioxide	9.78	14.90	14.50
Methane	....	0.20	....
Hydrogen	2.17	4.10	0.50
Nitrogen	58.10	57.30	57.00
	100.00	100.00	100.00
Carbon in flue dust, %	15.07	8.25	10.00
Temperature of slag, ° F	2568	2732	2700
Temperature of iron, ° F	2525	2642	2652

Condensed data from the thermal balance calculations are shown in Table VIII.

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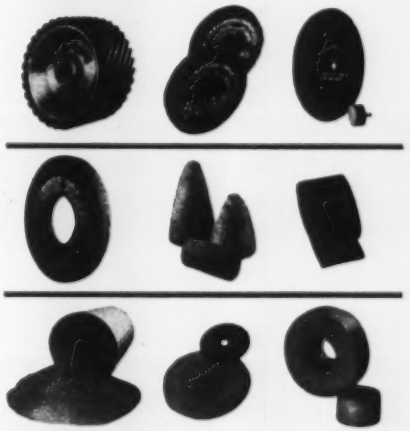

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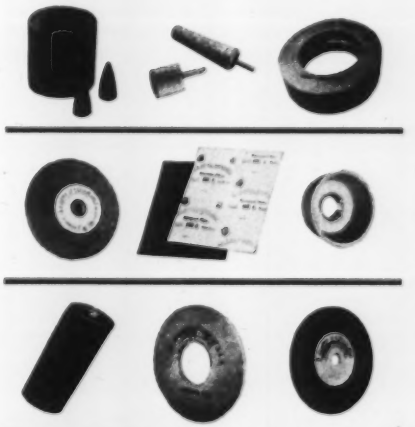

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duced only through direct contact with solid carbon and at temperatures which normally are available in the bosh and hearth only. Pounds of carbon consumed for the purposes cited are always a small percentage of the coke carbon charged to the furnace, but to the extent of that percentage Gruner's ideal is impossible of attainment.

2. The greater percentage of carbon consumed above the tuyeres is lost to gas through solution by the reversion of CO_2 to CO (CO_2 plus C = 100). Because of its relation to other thermochemical reactions of blast furnace operation, the reaction, although variable in amount, is inevitable to some degree in every blast furnace operation, and to the extent of that degree Gruner's ideal is impossible of attainment.

The consistency with which the carbon solution loss appears in all blast furnace operations, but the inconsistency in amount of it in relation to other associated reactions, has made its cause and effect on thermal economy a controversial subject since Gruner conceived his ideal. The inconstant relation to associated reactions is in itself the key to the understanding of its cause, and serves as a logical reason why it cannot be eliminated from blast furnace operation, therefore making Gruner's ideal impossible of attainment.

Theory Still in Favor—The persistency with which Gruner's theory continues to receive consideration is caused by assumed benefit to the fuel rate which would result if carbon lost to solution could be burned at the tuyeres to produce heat. Probably the assumed benefit would be obtained to some degree if all the carbon could be burned at the tuyeres, but, since basic principles of blast furnace operation preclude any possibility of preventing a loss of some of the carbon to solution, the only opportunity for reducing fuel rates lies in improving the efficiency in the recovery and the use of heat under conditions which the basic principles will permit.

In 1917 Howland[8] listed data from 26 blast furnace operations, which clearly showed that frequently the furnace operations having the largest carbon solution loss had the lowest fuel rates. His data showed there was less variation between the weight of the carbon consumed above the tuyeres than there was between the fuel rates. Consumption above the tuyeres ranged from 164 to 288 pounds per ton of iron, a variation of 124 pounds, while the pounds of coke consumed per ton of iron ranged from 1414 to 2335 pounds, a variation of 921 pounds per ton of iron.

In 1927 Joseph[9] extended Howland's list to a study of 71 furnaces covering American, British, and German operations, using natural raw materials with a wide range in chemical and physical properties, and with carbon solution losses ranging from 180 to 360 pounds and fuel rates from 1400 to 3200 pounds per ton of iron.

Data of the three furnace operations compared in this study includes one (East) where fully beneficiated raw materials were used, which shows carbon solution loss comparable to Howland's and

TABLE VIII
SUMMARY OF HEAT BALANCE CALCULATIONS

	South		North		East	
Heat Generated:	Lbs carbon burned to CO 1,671.80 lb		1,160.77 lb		790.39	
	BTU	%	BTU	%	BTU	%
Lbs carbon × 4370 Btu	7,305,766 =	73.23	5,072,565 =	66.86	3,454,004 =	65.61
Reduction of iron oxides	354,510	3.55	415,716	5.48	28,124	0.50
Heat in blast (dry)	2,284,689	22.90	2,057,000	27.11	1,748,251	33.21
Heat in blast moisture	31,850	0.32	42,000	0.55	36,152	0.68
	9,976,815	100.00	7,587,281	100.00	5,264,531	100.00
Heat Consumed:						
Reduction of silicon	412,878	4.14	277,331	3.66	211,573	4.02
Reduction of manganese	30,610	0.31	31,367	0.41	65,498	1.24
Reduction of phosphorus	86,684	0.87	10,201	0.13	44,399	0.84
Solution loss	1,273,972	12.77	735,921	9.70	1,320,437	25.08
Calcination of carbonates	1,176,470	11.79	702,000	9.25	247,050	4.69
Dissociation blast moisture	194,794	1.95	197,892	2.61	136,517	2.59
Carried off by gas (dry)	1,083,650	10.86	752,400	9.91	553,351	10.52
Carried off by gas moisture	651,819	6.53	700,100	9.23	122,241	2.32
Carried off by iron	1,086,400	10.89	1,142,500	15.06	1,146,880	21.79
Carried off by slag	1,500,632	15.04	909,000	11.99	797,424	15.15
Total accounted for	7,497,905	75.15	5,458,712	71.95	4,645,372	88.24
Radiation, cooling water, and unaccounted for	2,478,910	24.85	2,128,569	28.05	619,159	11.76
	9,976,815	100.00	7,587,281	100.00	5,264,531	100.00
Heat Distribution:						
Calcination of carbonates	1,176,470	11.79	702,000	9.25	247,050	4.69
Dissociation blast moisture	194,794	1.95	197,892	2.61	136,517	2.59
Carried off by gas (dry)	1,083,650	10.86	752,400	9.91	553,351	10.52
Carried off by gas moisture	651,819	6.53	700,100	9.23	122,241	2.32
Total	3,106,733	31.13	2,352,392	31.00	1,059,159	20.12
Carried off by slag	1,500,632	15.04	909,000	11.99	797,424	15.15
Total gangue consumption	4,607,365	46.17	3,261,392	42.99	1,856,583	35.27
Carried off by iron	1,086,400	10.89	1,142,500	15.06	1,146,880	21.79
Reduction Si, Mn, P	530,168	5.32	318,899	4.20	321,472	6.10
Total iron consumption	1,616,568	16.21	1,461,399	19.26	1,468,352	27.89
Solution loss	1,273,972	12.77	735,921	9.70	1,320,437	25.08
Radiation, cooling water, and unaccounted for	2,478,910	24.85	2,128,569	28.05	619,159	11.76
	9,976,815	100.00	7,587,281	100.00	5,264,531	100.00

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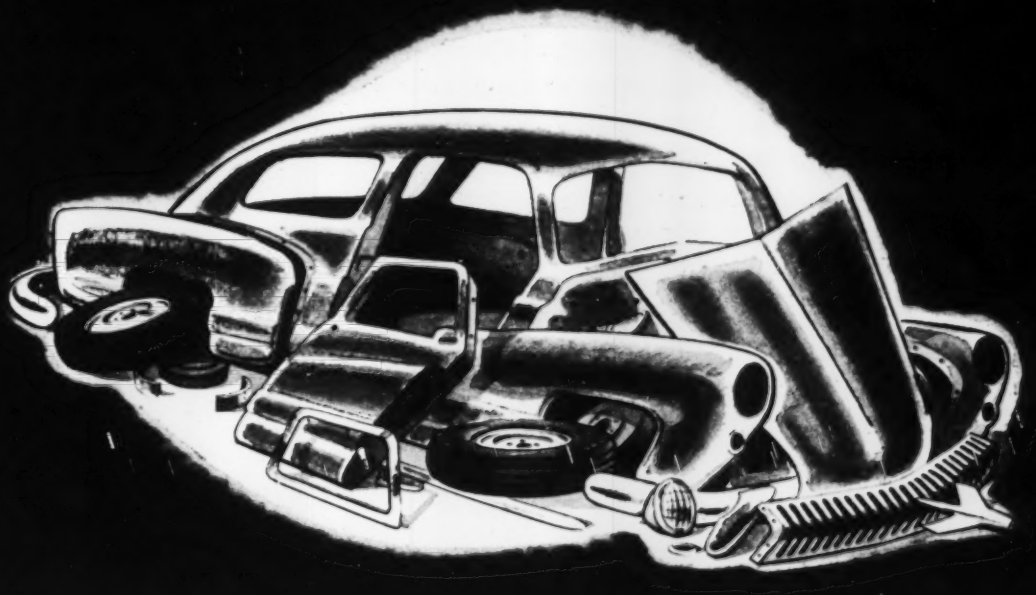

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Joseph's findings with furnaces using all natural materials.

(To be continued)

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[8] "Calculations with Reference to the Use of Carbon in Modern Blast Furnaces," A.I.M.E., Vol. 56, 1917.
[9] "Behavior of Coke in the Blast Furnace," Review Yearbook, A.I.M.E., 1927.

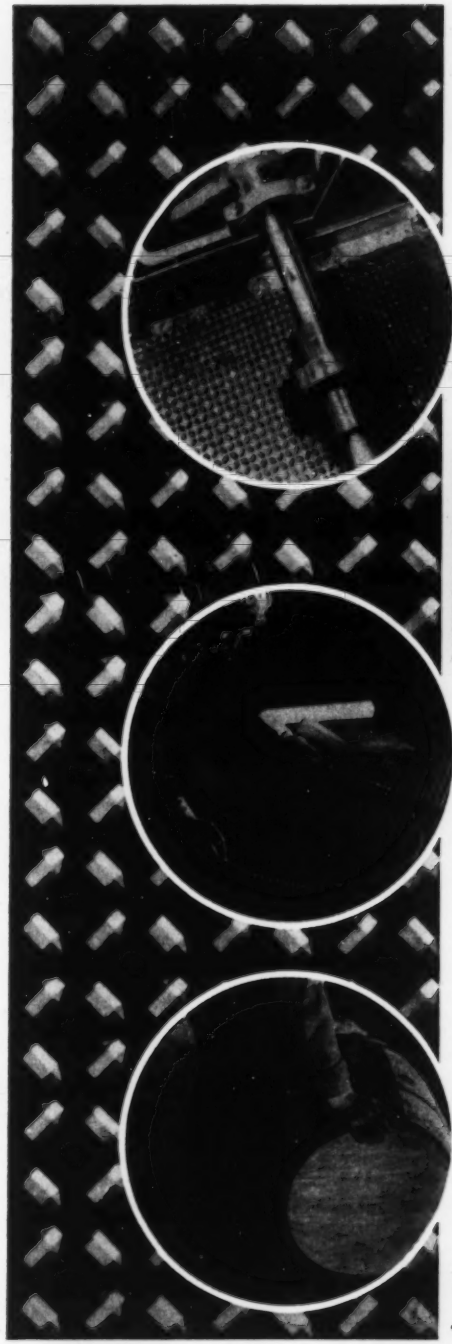
Amplifier Controls Cold Mill

Magnetic amplifier system developed by Westinghouse Electric Corp. will control a 66-inch four-stand tandem cold reduction mill being built for Pittsburgh Steel Co. The Magamp system will furnish excitation and regulate accurately the generator voltage supplying mill and reel motors. Mill is said to be the first installation to have twin-motor drives on all stands. These motors are connected through off-setting gears to upper and lower work rolls so rolls are driven independently. Twin-motor drive makes off-setting gears unnecessary since the two motors cannot be located to couple directly to the small diameter work rolls.

By making off-setting gears of different ratios, motors can operate at the same speed and be of duplicate design. Thus, six duplicate 2250-hp motors will be used for the three 4500-hp twin-drives on stands two, three and four. Selection of 200-450 rpm speed range allows extensive interchangeability of off-setting gear parts. Mill is scheduled for delivery to the Allenport, Pa., plant in 1953.

How to Make Pipe Last Longer

Prevention of fatigue and corrosion failure in oil well drill pipe is the subject of a pocket-size booklet, "How to Make Drill Pipe Last Longer," published by National Supply Co., Pittsburgh. Booklet explains destructive factors in non-technical language, recommending handling and operating practices that reduce their effect. Copies are available from the company's Spang-Chalfant Division, Pittsburgh.



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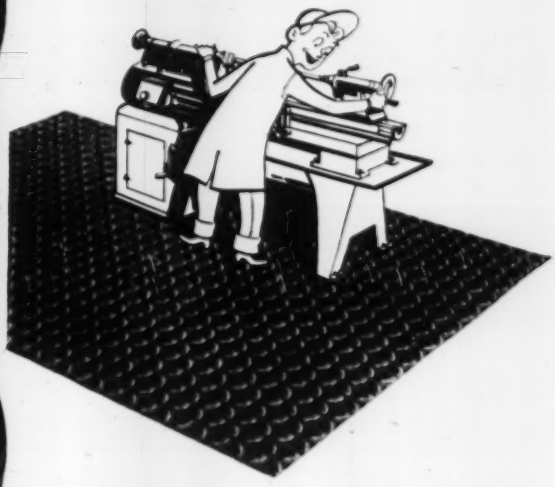

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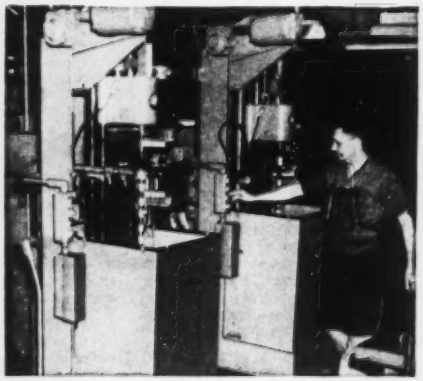

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INDUCTION HEATING

Tooling Can Be Cheaper

(*Continued from Page 99*)

result will be obtained when the parts are assembled together. Using cheaper techniques, as outlined here, the procedure is to weld every possible part in place then finish machine, mainly by grinding, all the accurate locating surfaces.

Easy-to-Build Jig—Simple drill jig for drilling and countersinking a mild steel link is illustrated in Fig. 2. A high degree of accuracy is not necessary in the component and only 5000 are required. The holes are first drilled from one side of the jig which is then turned over and countersinking is performed on the other side. The component rests in a milled out recess and is clamped by the swing clamp and bolt.

Main body of the fixture is a length of 2 x 4-inch structural steel channel material with clearance sawed into the upturned edges to form feet. Feet, fitted to the other side, consist of short lengths of heavy walled steel tubing welded in place. The corners where the tube contacts the machine table are chamfered to prevent burrs forming.

Jig was first assembled completely by welding on all the bandsawed parts. Welding must be done carefully to insure that machining allowances are provided on the faces where necessary. The complete welded assembly is then stress-relieved in a gas muffle furnace.

Jig is then finish machined. Recess for locating the component is milled out completely together with the end locations for the hinged plate, and the feet surfaced. All these machining operations are done by an apprentice on a vertical milling machine.

Unit Case-Hardened—The complete jig is case-hardened in a cyanide bath. This might seem to be a drastic procedure, but very little distortion of the jig resulted.

Locating the jig upon its main surface—the flat face in contact with the component—the feet were skimmed on the surface grinder. The jig is now ready for service when the hinged plate is assembled and the swing bolt mounted.

It will be apparent that if a fixture or jig body is regarded as a

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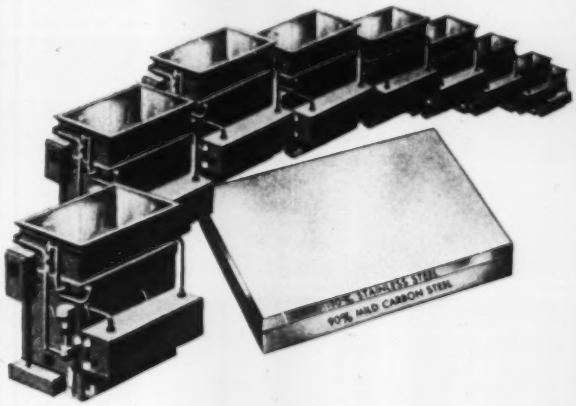

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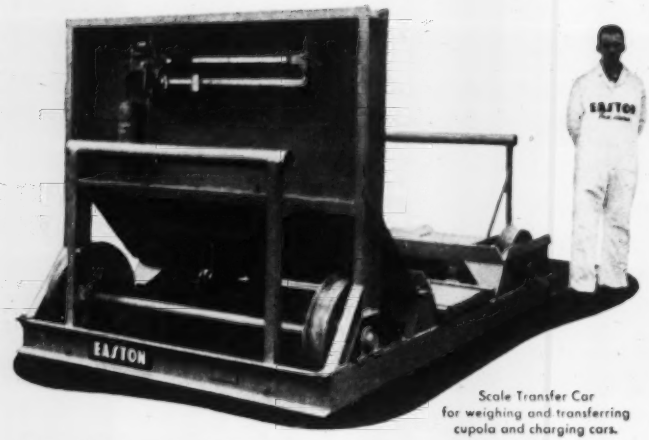

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unit which must be machined anyway, it is quicker to machine all the important parts in place upon the body, instead of first machining them and sticking them on later. In this case, every separate part must have locating means machined for it, both on the part itself and on the body to which it is attached. If the jig or fixture is machined as an assembly, only one set of surfaces will have to be machined, such as the feet, component locations and probably drill bush holes.

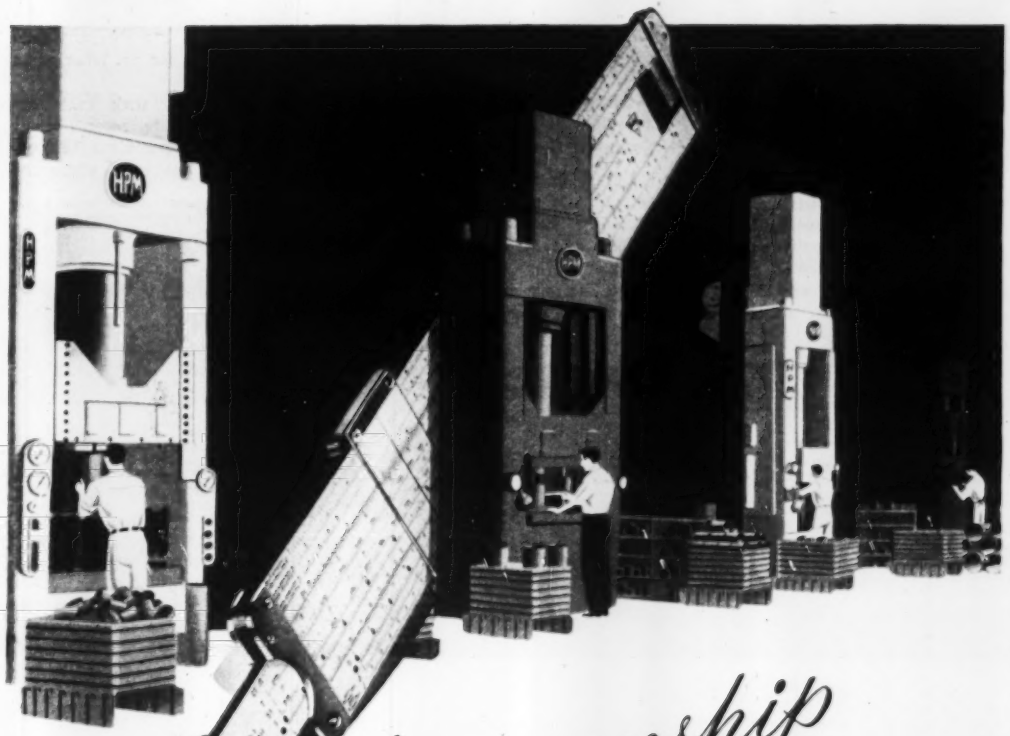
In the firm in which these procedures have been adopted, they find that it is often cheaper to tool a batch of work than to produce it with skilled men. Jigs have been made up for as few as 20 components. The technique insures also that tools are produced quickly. Time lag between completing the design and putting the jig into service is as low as two days, without disrupting the normal work of the tool room.

New Basis for Shock Testing

Automakers may use a Navy Research Laboratory report, "Resistance of Materials to Mechanical Shock," as a basis for future tests to help build a longer lasting product. To develop tougher military vehicles, scientists tried to learn why metal parts often fail rapidly due to severe vibrations caused by bumps. They found that common mechanical properties of materials measured by conventional engineering tests do not give reliable indications of ability to withstand vibration.

As a result, the Navy's laboratory studied methods for determining relative ability of materials to withstand shock loading and factors on which this resistance depends. Using a special testing machine, developed to simulate shocks experienced in service, they found: What kind of machines provide a dependable measure of relative shock resistance; and what significant factors comprise a material's shock resistance. Using this information as a guide, automakers, as well as military equipment builders, may learn to design their products to stand up longer under normal service wear.

This 28-page report, PS 105 301,



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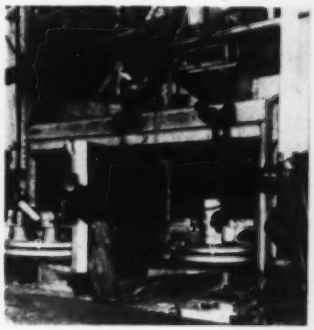
Spectrographers Meet Mar. 5-7

Techniques and instrumentation for steel industry research will be discussed and demonstrated at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy March 5-7. Among 121 papers to be presented at Hotel William Penn are studies of emission, absorption, infra-red and mass spectroscopy, plus the x-ray technique of analysis.

Swinging Door Speeds Blasting

Latest in a bank of eight different units used by Farrell-Cheek Steel Co., Sandusky, O., to clean carbon and steel castings is the Rotoblast Turn-Style table. It blasts castings up to 6½ feet long, 5 feet high and weighing 1500 pounds, averaging 40-50 loads per eight-hour day. The company estimates its work has cut labor costs 22 per cent.

Cleaning door, with table attached to each side, rotates about a center axis. This enables the operator to load one table while the other holds its load inside the cleaning room, and keeps the machine in action 85 per cent of the time. Abrasive cleans by centrifugal force as work passes under the abrasive-throwing wheel. Cleaner blasts green work in eight minutes; annealed castings in twelve.



BLASTING ROOM IS NEVER IDLE
. . . 40-50 loads per eight-hour day

Unit Controls Boiler Smoke

Elimination of smoke from vertical tube boilers is the function of an installation developed by Economy Smokeater Inc., Amsterdam, N. Y. Control is effected when two stay-bolts are removed, extra-heavy tube sections are welded in their place and jets fitted over the tube ends. System then is piped to pass steam from the header through a throttling valve, through the cartridge to the jets.

Calculator Shows Ton-Pressure

Calculator that determines required ton-pressure for piercing a given hole in any thickness and type of metal is offered by Ward Machinery Co., Chicago. Sliding scale designates pressure in tons, without computing, for holes from 3/16 to 10 inches diameter and ½ to 30 inches perimeter. Calculator is 8¾ inches long, 3½ inches high. It is available to all shops doing stamping work on request to the company, 564 W. Washington Blvd.

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New Books

Fundamentals of Grinding

THE GRINDING WHEEL, by Kenneth B. Lewis; cloth, 409 pages, 6 x 9 inches; sponsored by the Grinding Wheel Institute, Greendale, Mass. and published by the Rumford Press, Concord, N. H.; for $3.50, available from STEEL, Penton Bldg., Cleveland 13, O.

Here is a book that you will want to keep within easy reach if you have anything to do with modern grinding. Its contents afford a solid grounding in the fundamentals of abrasive technology and will be found of untold value to the apprentice, the student, the executive and the employee interested in grinding practice.

At the outset the author tells about abrasive materials including the emery wheel, silicon carbide, aluminum oxide and the diamond and in so doing gives a case history of each, their characteristics and advantages. How grinding wheels are made, their shape and sizes, how they are trued, dressed, balanced and crush-formed are explained.

Separate chapters are devoted to cylindrical, centerless, surface and internal grinding. It is the "how it is done" in these chapters that holds the attention of the reader. Taking the chapter devoted to cylindrical grinding as an illustration, a wealth of information is presented without much ado on such phases as early development, speed and feed, elements, infeed, lubrication, automatics and special machines, shoulder grinding, maintenance, steadyrests and 27 tips on this type grinding. The other chapters are equally informative.

Questions that may arise on the grinding floor on such subjects as the grinding of threads, gears, cranks and cams, rolls, nonmetallics and metal carbides are answered in a satisfying manner in separate chapters devoted to these parts. In the case of thread grinding, the reader is confronted with a wealth of detail covering such items as methods, adjustment for the helix angle, the wheel, coolant, gaskets, speed and feed, rotation and attachments. The remaining subjects in this group are detailed just as carefully.

Other important subjects bound to hold the attention of the reader deal with honing, lapping and superfinishing, cutting-off practice, factors affecting wheel selection and grinding costs.

The treatise is brought to a close with appendices of inestimable value.

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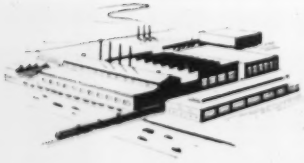

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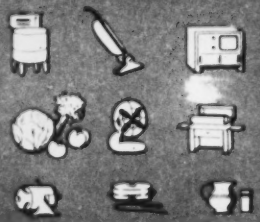

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One is a 16-page tabulation of grinding wheel recommendations for the abrasive, grain size, grade and bond covering 193 materials. Another appendix listing grinding faults is designed to show how grinding problems may be solved without recourse to specially made wheels. Grinding wheel safety, the American standard for identifying grinding wheels and other bonded abrasives including a full-page marking chart, and a glossary of grinding terms are included.

A word about the author. He brings into the treatise an industrial background of experience covering many years. He writes with a style all his own; it invites many a chuckle and compels close reading lest something of importance be overlooked. The reader after spending hours in this book is bound to close it with the assurance of a well-built foundation in the abrasive field.

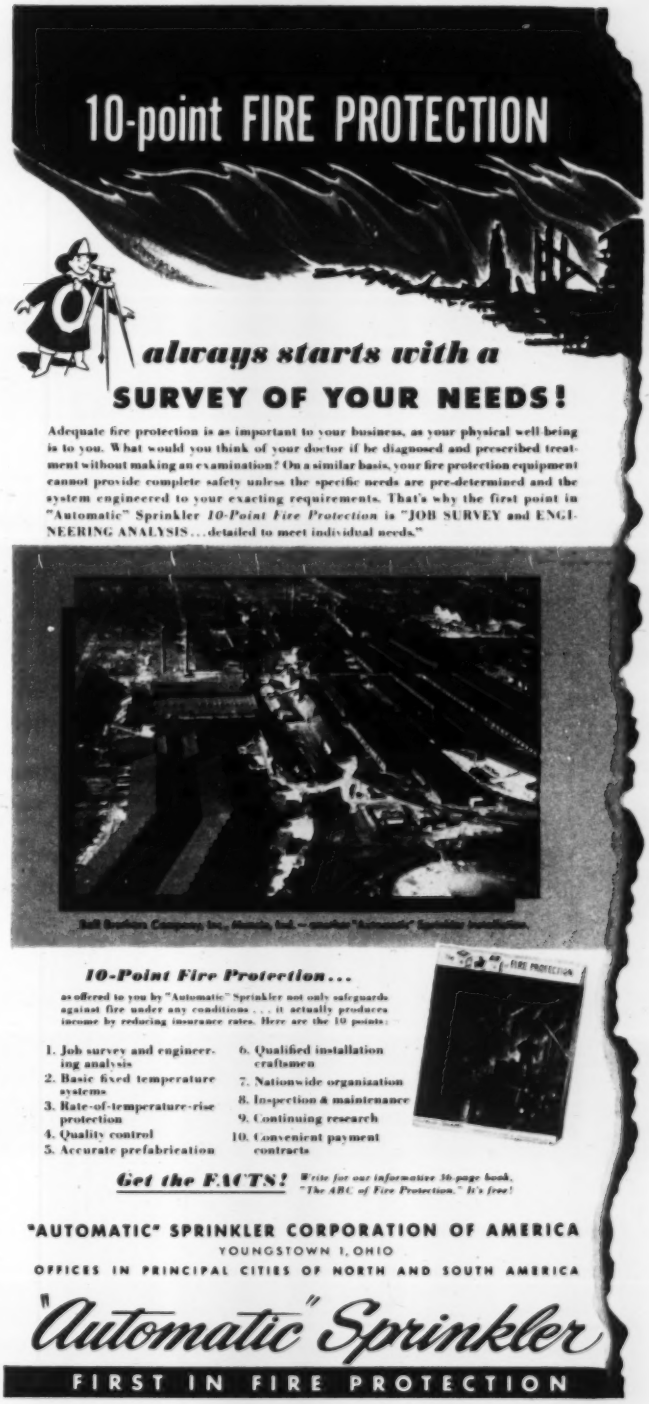
Phenomenon of Phase Change

PHASE TRANSFORMATION IN SOLIDS, sponsored by Committee on Solids, Division of Physical Science, National Research Council; cloth, 660 pages, 5½ x 8½ inches; published by John Wiley & Sons Inc., New York, N. Y., for $9.50; available from STEEL, Penton Bldg., Cleveland 13, O.

This book is the result of a symposium held at Cornell University which brought together scientists from many different fields having a common interest in the fundamental phenomena accompanying phase changes. It contains seventeen papers that were presented and the discussions that followed. They were prepared for publication by an editorial committee headed by Dr. R. Smoluchowski of Carnegie Institute of Technology.

The papers contain a large amount of new results and there is almost no overlapping of subject matter. They can be divided into three main groups: A theoretical-physical group, a group dealing with nonmetals and one dealing with metals.

Papers and authors included are: On the General Theory of Phase Transitions, Laszlo Tisza; A General Method for Imperfect Crystals and Phase Transitions, Joseph E. Mayer; Crystallization as a Co-operative Phenomenon, John G. Kirkwood; Fundamental Aspects of Diffusion in Solids, Frederick Seitz; Nucleation Theory, R. Smoluchowski; Crystallographic Aspects of Phase Transformations, M. J. Buerger; The Solid-Liquid Transition in Argon, O. K. Rice; Transitions in Silver Halides, M. L. Huggins; Phase Transformations in One-Component Silicate Systems, F. C. Kracek; Phase Transformations in Polycomponent Sili-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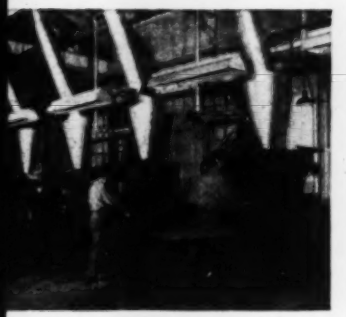

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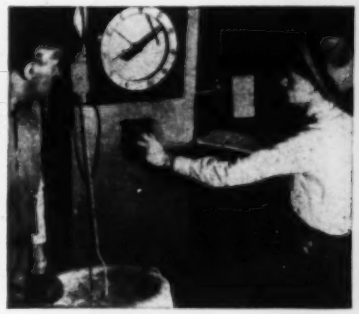
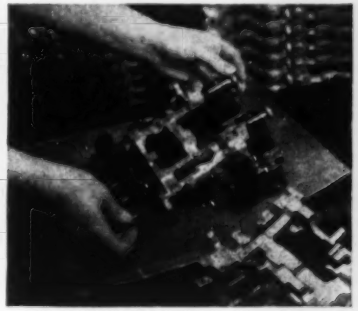


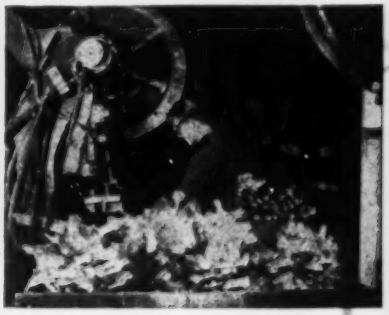
POURING TEMPERATURES—are constantly checked and recorded at control stations on all foundry floors. Procedure like this and continuous alloy control guarantee highest quality aluminum castings and die castings.

HIGH PRODUCTION CAPACITY—of Alcoa's die casting plants is partially represented in this row of cold chamber machines at Alcoa's Chicago die casting plant.

PERMANENT MOLD CASTING—formerly considered for small parts only. Today permanent mold castings weighing up to 500 pounds are not unusual.



INSPECTION—of every part is standard practice in Alcoa plants. Dimensional checks, as shown here, or visual inspection by trained personnel reduces costly rejects. Metallurgical checks further guard the castings' quality.



FINISHING—many secondary machining operations are performed by Alcoa foundries and die casting plants. Machining, grinding, sand blasting, and ball burnishing are but a few.

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While the sale of our products is presently controlled by government regulations, you'll find no limitations on help in design, application or fabrication. Your local Alcoa sales engineer and your local Alcoa distributor are headquarters for "everything" in aluminum. They will cooperate to the fullest in helping you get the metal you need. They are listed under "aluminum" in your classified phone book.

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cate Systems, J. F. Schairer; Transitions in Glass, Woldemar A. Weyl; Phase Transitions in Ferroelectrics, Bernd Matthias; Transformations in Pure Metals, Charles S. Barrett; Order-Disorder Transitions in Metal Alloys, Sidney Siegel; Precipitation from Solid Solutions of Metals, A. H. Geisler; The Eutectoid Reaction, Robert F. Mehl and Arthur Dube; The Martensite Transformation, Morris Cohen.

Inspection in Mass Production

INSPECTION AND GAGING, by C. W. Kennedy; cloth, 502 pages, 6 x 9 inches; published by The Industrial Press, New York, N. Y., for $7.50; available from STEEL, Penton Bldg., Cleveland 13, O.

In clear, easy to understand language, the way in which many functions of inspection are carried out in industry and the important part they play in mass production are explained in this book. Various types and uses of gages and measuring instruments are described and explained and directions are given for applications.

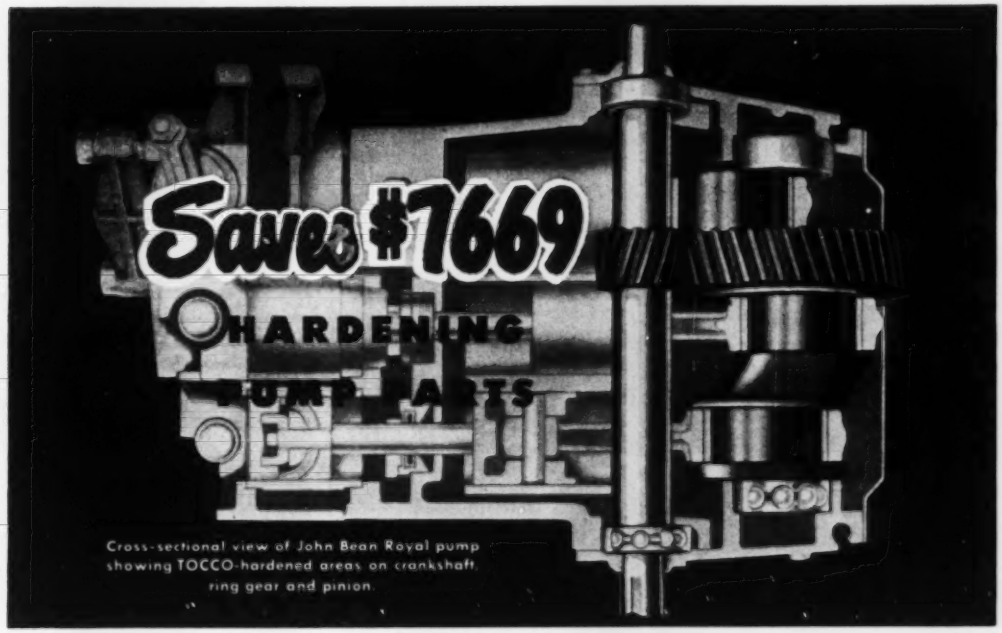
Other helpful information in this well-illustrated book includes: How standards are established and employed for improvement of product quality; steps necessary for proper care and maintenance of measuring and gaging equipment; functions of various kinds of dial indicating equipment and test sets; step by step account of how surface plate setups are made and a sequence of inspection operations carried through; various kinds of process inspection.

Instrumentation of Furnaces

THE INSTRUMENTATION OF OPEN-HEARTH FURNACES, by Open-Hearth Instruments Sub-Committee of Steelmaking Division of British Iron & Steel Research Association; cloth, 159 pages, 5 x 8½ inches; published by George Allen & Unwin, London, England.

Intended for use by melting shop managers and their staffs, this book deals exclusively with instrumentation of open-hearth furnaces. It should also serve as an elementary guide for those actually engaged in maintenance of open-hearth furnace instruments.

First part suggests how they can be applied to individual furnaces to determine the working conditions that will give the fastest and most economic operation and how these conditions can be maintained over a prolonged period within closer limits than is possible with uninstrumented furnaces. Second part is devoted to brief descriptions in nontechnical language of the proprietary instruments most commonly used in British melting shops. Many line drawings are used.



Cross-sectional view of John Bean Royal pump showing TOCCO-hardened areas on crankshaft, ring gear and pinion.

with TOCCO* Induction Heating

Progressive engineers at John Bean Manufacturing Company recently adopted TOCCO Induction Heating for hardening vital parts on famous Royal high pressure pumps. The annual savings of $7669 is typical of the experience of thousands of metal-working plants who have adopted economical TOCCO for hardening, brazing, soldering, and heating for forging.

TOCCO IS ECONOMICAL—Cost of heat-treating parts shown was cut from $3.51 to 95¢ when TOCCO replaced conventional heat-treating methods.

TOCCO IS DEPENDABLE—Rejects due to variation in heat-treating are eliminated because TOCCO is automatic—produces identical results—one part or a million.

TOCCO IS FAST—Hourly production rates of the crankshaft are 40 per hour, of the ring gear 25 per hour, and the pinion 20 per hour.

TOCCO IS VERSATILE—One unit, a 125 K.W., 10,000 cycle TOCCO machine hardens all these parts, and also shrink-fits gear to eccentric shafts.

Our Engineers can probably find applications in your plant, too, where TOCCO can increase output and cut unit costs. Having such a survey made costs you nothing—and may save you a great deal.

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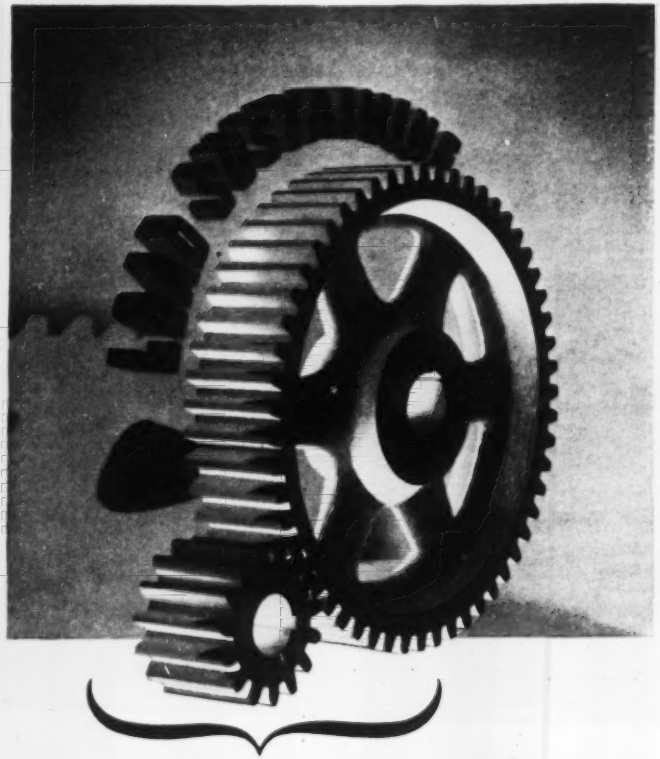

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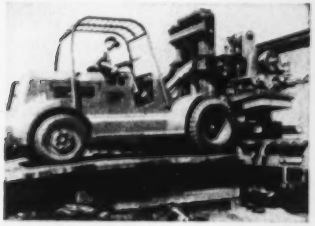
Kaiser Pushes Aircraft Tooling

Kaiser-Fraser Corp.'s Detroit Engine Division unloaded and moved 800 pieces of machinery from 185 railway cars and 40 trucks in 27 working days. Need for speed arose when the division received shipment of equipment for retooling its Dowagiac, Mich., plant to process Wright R-1300 aircraft engine parts. The task was accomplished at Dowagiac without benefit of a permanent loading installation.

Emerson Truck & Storage Co., Battle Creek, Mich., did the job



UNLOADING TOOLS AT DOWAGIAC
. . . 800 pieces in 27 working days

with Clark materials handling equipment. The firm used three Yardlift 150 pneumatic-tired lift trucks and a towing tractor to move tools that ranged from single-spindle drill presses to a 25,000-pound Bullard Mult-Au-Matic. Capacity of the trucks reaches 15,000 pounds, so two were worked as a team to move the big Bullard.

Another problem solved in the operation was that of lifting some of the equipment to the second floor for installation. To do this, the trucks worked in an open well in the center of the building, serving as elevators. A 5½-ton turret lathe, with other machinery, was hauled from the well on rollers and spotted by the towing tractor.

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Thermostatic control arrangement enables a hot vapor degreaser to operate efficiently while protecting elements from destructive overheating. Controls, called Thermoswitch units and made by Fenwal Inc., Ashland, Mass., prevent heavier-than-air vapor from evaporating and protect heater from burning out because of sludge ac-

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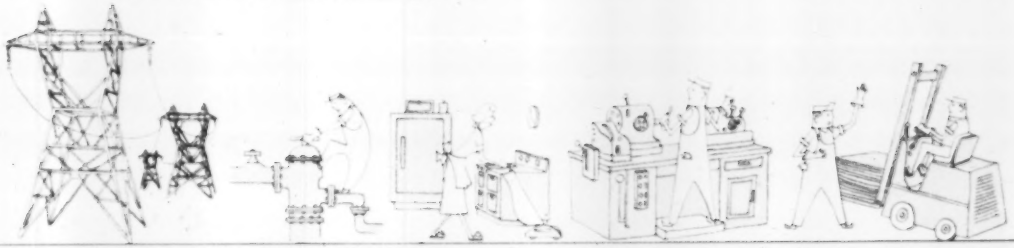

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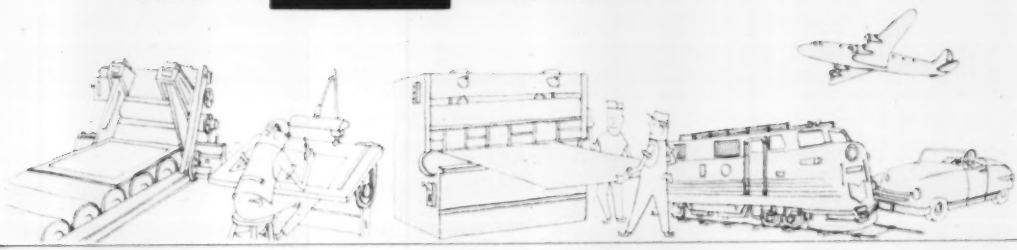
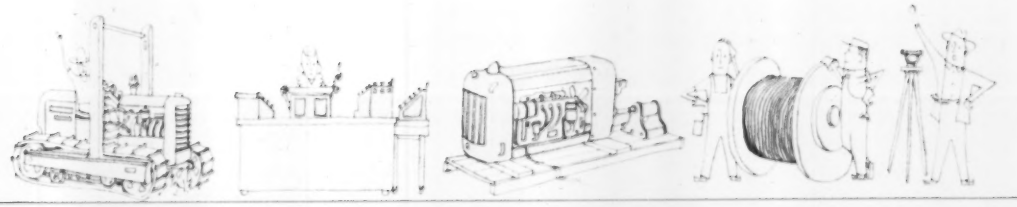


the Metalworking Industry...



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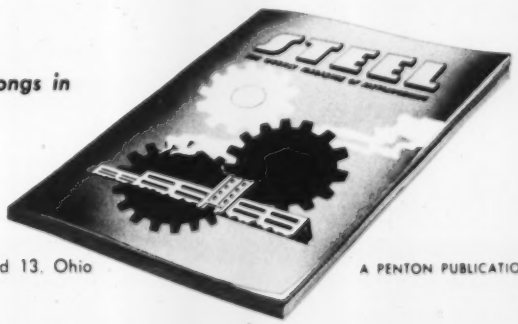

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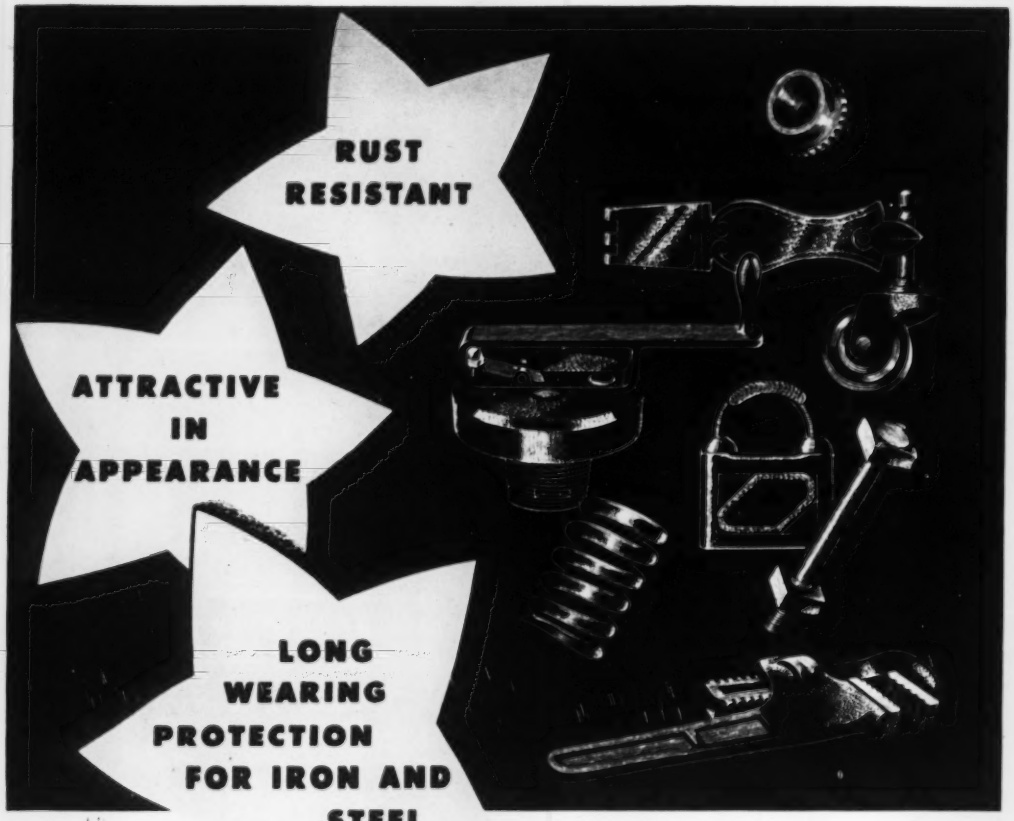

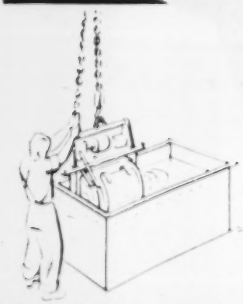

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Specific gravity readings, unless corrected for the temperature of the electrolyte at the time they are taken, do not always give a true indication of battery condition. How to make these corrections is explained briefly below. More complete information on this important subject is contained in the vast library of technical information—covering every phase of battery care—available to you free, without obligation, with the GOULD PLUS-PERFORMANCE PLAN. Use this Plan consistently and you can improve your battery performance as much as 50%! Send for this free booklet describing the Plan in detail.

HOW TO CORRECT SP. GR. READINGS FOR TEMPERATURE

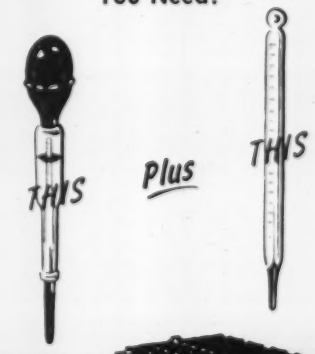
For a true picture of battery condition, each specific gravity reading must be corrected in accordance with the temperature of the electrolyte at the time the reading is taken.

To make such a correction, add one point (.001) in specific gravity to the actual hydrometer reading for each 3° F. in electrolyte temperature above 77° F.; and subtract one point (.001) in specific gravity from the actual hydrometer reading for each 3° F. below 77° F.

EXAMPLE:

HYDROMETER READING	CELL TEMPERATURE	CORRECTION	READING CORRECTED TO 77° F.
1.213 Sp. Gr.	68° F.	−.003 points	= 1.210 Sp. Gr.
1.207 Sp. Gr.	86° F.	+.003 points	= 1.210 Sp. Gr.
1.204 Sp. Gr.	95° F.	+.006 points	= 1.210 Sp. Gr.

For Correct Specific Gravity Reading You Need:



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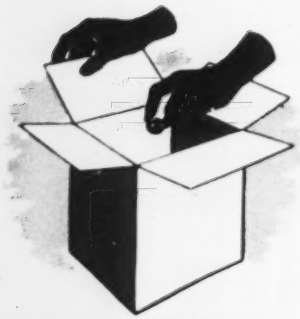

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Dutron was organized several years ago as a company specialized in meeting specific packaging needs for many industries. The company is devoted exclusively to this packaging operation and engages in no manufacturing of its own. Complete facilities are available for all types of government and military packaging as well as final inspection facilities on the premises.

Packaging operation using AXS 1222; JAN P 116 Gov. spec. method 1A8.

Packaging line for Grade C wrap and wax dip.

We can do these things for YOU too!

- Collection of parts from outside suppliers.
- Warehouse storage facilities.
- Package engineering.
- Assembly.
- Wrapping, packaging, crating.
- Storing of packaged parts.
- Safety for military requirements.
- Shipping by all means of transportation.
- Drop shipping and billing.
- Direct shipment of Government packaged material.

We'll gladly send descriptive brochure.

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Dutron CORPORATION
CASSOPOLIS, MICHIGAN

cumulation's insulating effect at the tank bottom.

Effective vapor level control requires a sensitive device capable of quick response. A normally-closed thermostat unit, sensitive to less than 0.5 F and installed inside the tank at danger level, does the job. Set to function at 170 F, it opens the circuit instantly when vapor rises to this level. As vapor recedes, unit is activated by the temperature drop and puts the heater back into operation.

Heater elements at the bottom are protected similarly from overheating by a second control unit. This unit, set at 235 F, is installed adjacent to the heaters. When insulating action of accumulated sludge raises temperature to the critical point, it cuts off power to the circuit.

Die Steel Is Easy to Hob

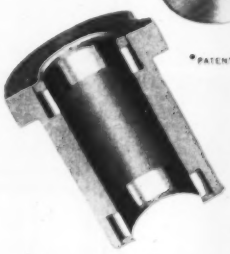
Die steel that approaches hobbing ease of regular hobbing irons yet compares with the high strength of 5 per cent chrome hot work die steel is announced by Carpenter Steel Co., Reading, Pa. Steel was developed primarily for applications involving die casting of aluminum and zinc. It is also being used in plastic mold work involving large cavities or elevated temperatures.

Known as Super Samson, steel is said to be 50 to 60 per cent as easy to hob as soft hobbing irons, and combines high strength with resistance to heat and abrasion. It will harden uniformly in dies with wall thicknesses up to at least 4 inches.

Pipe Thread Data Published

External straight and taper pipe thread information is given in a booklet prepared by Reed Rolled Thread Die Co., Worcester, Mass. Data presented on taper pipe threads include tolerances, thread form specifications, diameters and lengths, with illustrations of crest and root clearances and interferences. On straight pipe threads, the booklet reports thread form specifications and a listing of diameters. General information lists identification symbols, pipe sizes and threads per inch for commonly

MEYCO
CARBIDE INSERTED
DRILL JIG BUSHINGS



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☆ Combining the best features of steel and carbide—here is the answer to increased production and to tough drilling problems: MEYCO Carbide Inserted Drill Jig Bushings.

MEYCO bushings last as long as solid carbide bushings in most cases and cost a great deal less—they will increase the life of drill jigs, fixtures, drills and reamers—they will maintain accuracy for a much longer period of time—they will increase production, save you money in machine-down time, lost man-hours and less spoilage.

MEYCO bushings are made to A.S.A. Standards in Headless Press Fit, Head Press Fit and Fixed Renewable Types. MEYCO Bushings can also be adapted to many special applications—write for fully informative catalog No. 32 today.

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. . . So you'll be among the first to know how the No. 20 Radiagraph cuts circles and arcs, any length straight lines, simultaneous parallel lines — with single or double bevels, and irregular shapes.

. . . So you'll know how this 57-lb. one-man portable can be put to work for you, we've written up all the detailed information you need in a quick-reading, 8-page folder. To get your copy of the No. 20 Radiagraph catalog, please fill in the attached coupon and mail it to us today, or write us on your business letterhead.

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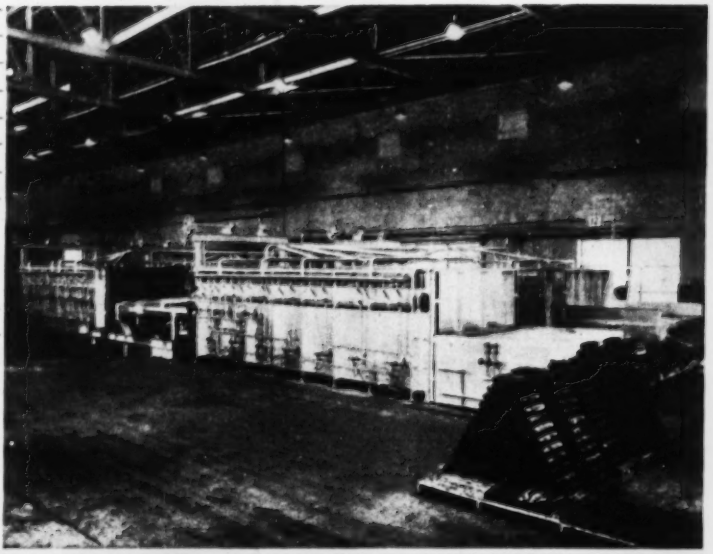
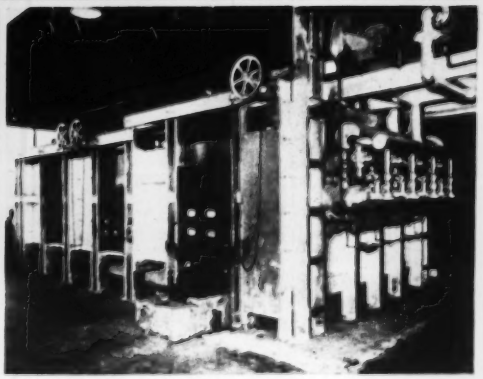


Loftus heat treat line for treating shell cases provides completely automatic operation from loading conveyor to unloading conveyor.

They Specify Loftus for Outstanding Performance!

Production rate increases of 50% have been achieved through installation of this Loftus strand furnace.



Loftus automatic continuous furnace for forging and heating produces loose, easily removed scale.

LOFTUS

Loftus customers' experience has proven the superior performance, greater efficiency, and faster production rates achieved with Loftus heat treating furnaces. Loftus offers exclusive features such as "Pin-Point Quench" which assures absolutely accurate quench temperature. The Loftus "COVERALL" contract includes design, construction, installation, and operation.

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Designers and Builders of Industrial Furnaces
610 Smithfield Street, Pittsburgh 22, Pennsylvania

used threads with terms and formulae. Copies are available from the company, Box 350, Worcester.

Plastic Paste Protects Platers

Plastic paste developed by Munray Products Inc., Cleveland, protects outside surfaces of plating rinse tanks from corrosive chemicals. Applied with a hand trowel, the putty-like protector is spread to any desired thickness—usually 1/16 to 1/8-inch. Use of special dipping equipment is unnecessary.

Compound results from a jelling agent added to Geon 121 vinyl resin paste made by B. F. Goodrich Chemical Co. Oven baking or infra-red lamps fuse the coating to a Durometer A hardness of 90-95. Safety in application is gained by absence of volatile materials. No change in viscosity was reported during storage.

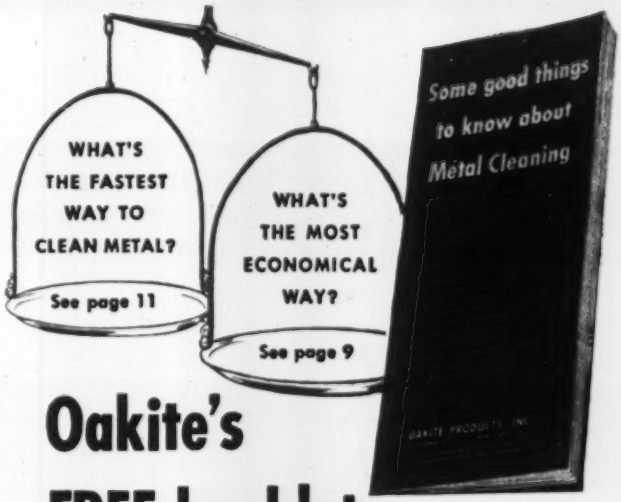
Precision in Heat Processing

Precision methods in heat processing to achieve a better product, more production, lower unit costs are described in "Why Heat Processing," a four-page bulletin published by Selas Corp. of America. Bulletin urges precision in heat processing comparable to the precision in chemical compounding, metal machining, glass forming, paper and textile production. Principles of heat application for a variety of solid and fluid products are described and illustrated. Booklet is available upon request from the company at Philadelphia, 34.

Folder Describes Hot Forming

Tube Reducing Corp. makes available a four-page folder entitled, "Machine Hot-Forms Tubing Into Complex Parts." Folder discusses economic advantages of hot-forming complex finished parts in the same plant where precision-sized tubing is produced. Described are a machine for hot forming and the segmented, three-piece dies it uses.

Also discussed are variables that determine wall thickness and surface characteristics of the finished parts. Picture stories show manufacture of landing gear and rocket bodies. Folder may be obtained by writing the company at Wallington, N. J.


WHAT'S THE FASTEST WAY TO CLEAN METAL?
See page 11
WHAT'S THE MOST ECONOMICAL WAY?
See page 9
Some good things to know about Metal Cleaning

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answers many questions that mean better production, more profit for you. Just look at the table of contents:

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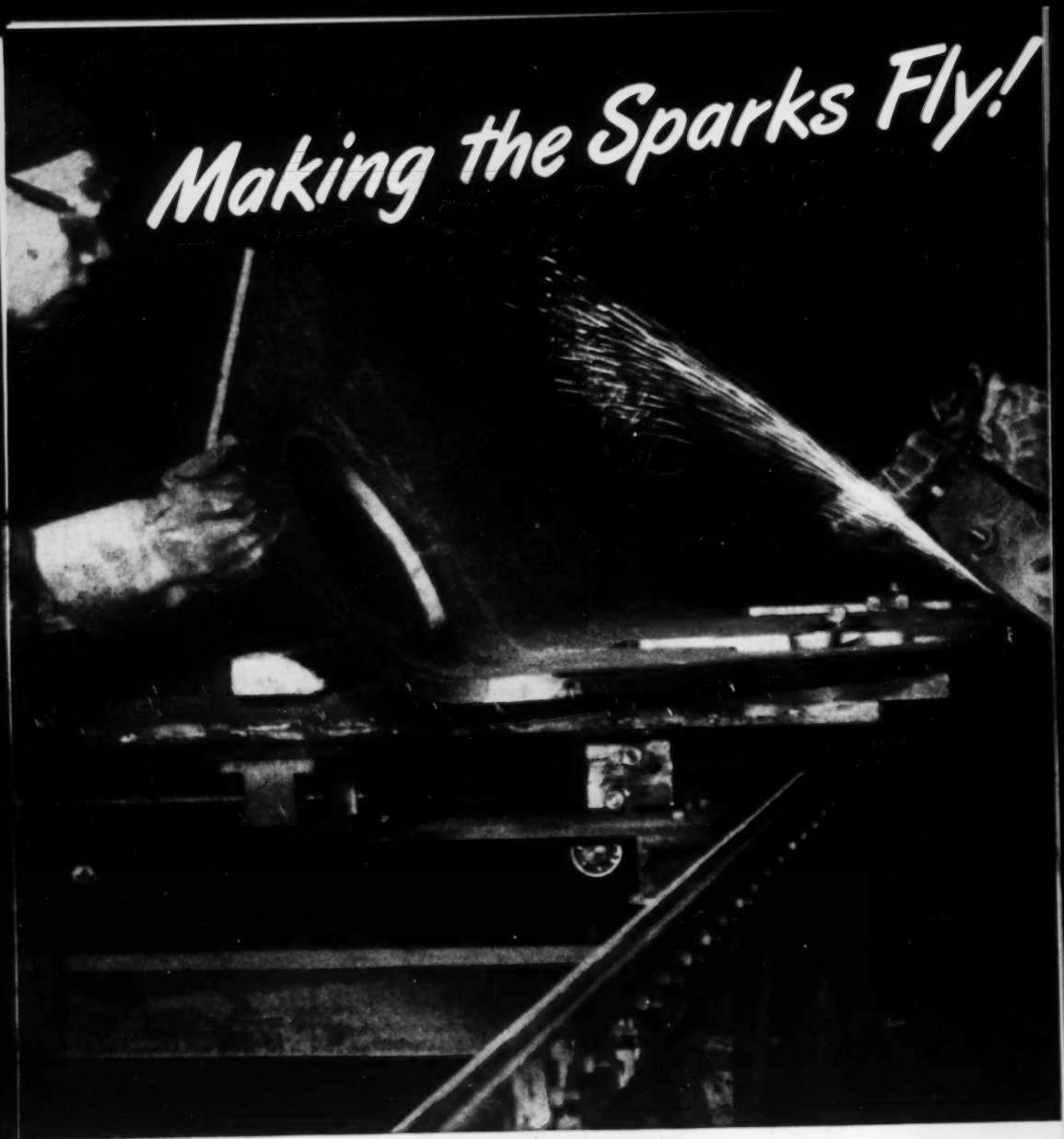
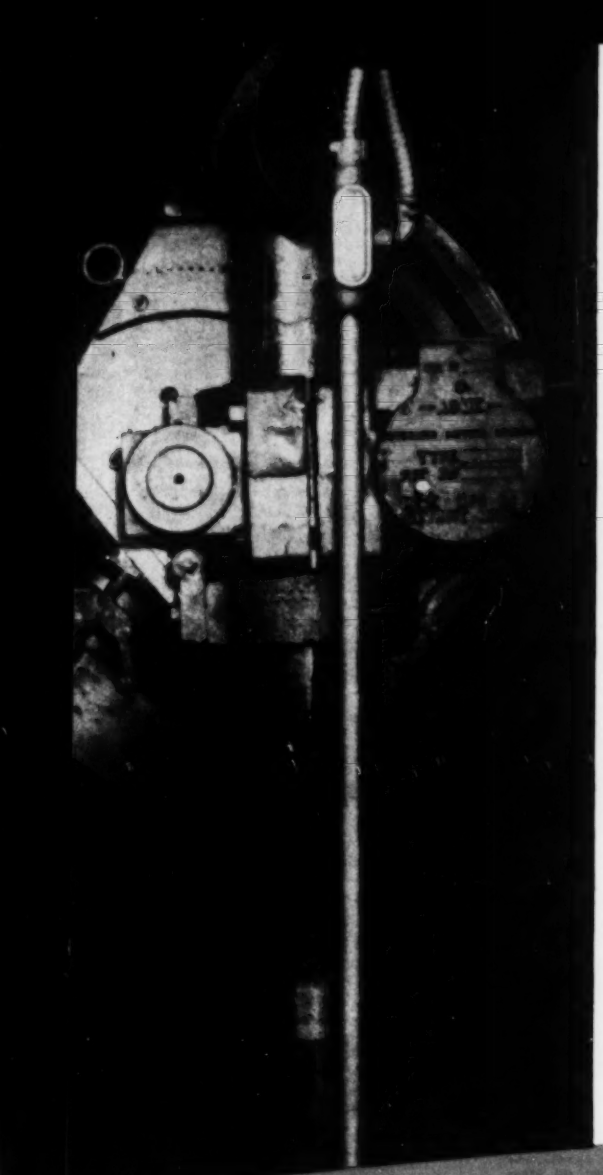


Edge preparation of armor plate.

ORDNANCE



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ARMOR PLATE

CALENDAR OF MEETINGS

† Denotes first listing in this column.

February 18-21, Automotive Electric Association: Annual meeting. Edgewater Beach Hotel, Chicago. Association address: 800 Michigan Bldg., Detroit 26. Secretary: S. W. Potter.

February 18-19, National Association of Aluminum Distributors: First annual meeting. Hotel Drake, Chicago. Association address: 905 Midland Bldg., Cleveland 13. Executive secretary: Raymond L. Collier.

February 18-20, National Crushed Stone Association: Annual meeting. Hotel Conrad Hilton, Chicago. Association address: 1415 Elliot Place NW, Washington 7. Administrative director: J. R. Boyd.

February 18-20, American Management Association: Personnel conference. Palmer House, Chicago. Association address: 33 W. 42nd St., New York.

February 18-21, American Institute of Mining & Metallurgical Engineers: Annual meeting. Hotel Statler, New York. Institute address: 29 W. 39th St., New York. Secretary: Edward H. Robie.

February 21-22, Society of the Plastics Industry (of Canada) Ltd.: Annual conference. Royal York Hotel, Toronto. Society address: 67 W. 44th St., New York 18. Executive vice president: William T. Cruse.

February 25-26, Materials Handling Conference: Purdue University, sponsor. Address: W. Lafayette, Ind.

February 25-28, Industrial Ventilation Conference: School of Engineering, Michigan State College, E. Lansing, Mich. Secretary: K. E. Robinson, Division of Industrial Health, Michigan Dept. of Health, Lansing, Mich.

February 28, Bituminous Coal Research Inc.: Annual meeting and exhibit. Edgewater Beach Hotel, Chicago. Address: 804 Southern Bldg., Washington 5. Secretary: C. A. Reed.

March 3-7, American Society for Testing Materials: Spring meeting & committee week. Hotel Statler, Cleveland. Society address: 1916 Race St., Philadelphia. Secretary: C. L. Warwick.

March 4-6, Society of Automotive Engineers: National passenger car, body and materials meeting. Hotel Book Cadillac, Detroit. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

March 5, Manufacturers Standardization Society of the Valve & Fittings Industry: Annual meeting. Hotel Commodore, New York. Society address: 420 Lexington Ave., New York 17. Secretary: Lester W. Benoit.

†March 5, Steel Kitchen Cabinet Manufacturers Association Inc.: Quarterly meeting. Hotel Cleveland, Cleveland. Association address: Engineers Bldg., Cleveland 14. Secretary: Arthur J. Tuscany.

March 10-14, National Electrical Manufacturers Association: Spring meeting. Edgewater Beach Hotel, Chicago. Association address: 155 E. 44th St., New York 17. Managing director: W. J. Donald.

March 10-14, National Association of Corrosion Engineers: Annual conference and exhibit. Hotels Buccaneer and Galvez and Galveston Municipal Pier, Galveston, Tex. Association address: 919 Milam Bldg., Houston 2. Secretary: A. B. Campbell.

March 11-14, Society of the Plastics Industry Inc.: National Plastics Exposition, Convention Hall, Philadelphia. Society address: 67 W. 44th St., New York 18. Executive vice president: William T. Cruse.

March 12-14, American Society of Training Directors: Annual conference, French Lick Hotel, French Lick Springs, Ind. Secretary: R. c L. Moberly, University of Wisconsin, Madison, Wis.

March 16-19, American Institute of Chemical Engineers: Annual spring conference. Biltmore Hotel, Atlanta. Institute address: 120 E. 41st St., New York 17. Secretary: Stephen L. Tyler.

†March 17-19, Midwest Conference on Fluid Mechanics: Ohio State University, Columbus, O. General conference chairman: Prof. A. N. Tifford, aeronautical engineering department, Ohio State University.

March 17-19, National Association of Waste Material Dealers Inc.: Annual meeting. Waldorf-Astoria Hotel, New York. Association address: 271 Madison Ave., New York. Secretary: Clinton M. White.

March 17-21, American Society of Tool Engineers: Annual meeting and biennial industrial exposition, International Amphitheater, Chicago. Society address: 10700 Puritan Ave., Detroit. Secretary: Harry Conrad.

March 18-19, Steel Founders' Society of America: Annual meeting. Edgewater Beach Hotel, Chicago. Society address: 920 Midland Bldg., Cleveland 15. Secretary: F. Kermit Donaldson.

March 20-21, Pressed Metal Institute: Spring technical meeting. Hotel Carter, Cleveland. Institute address: 13210 Shaker Square, Cleveland 20. Manager: Orrin B. Wernta.

March 21, Materials Handling Institute: Edgewater Beach Hotel, Chicago. Institute address: 731-732 DuPont Circle Bldg., Washington 6. Managing director: R. Kennedy Hanson.

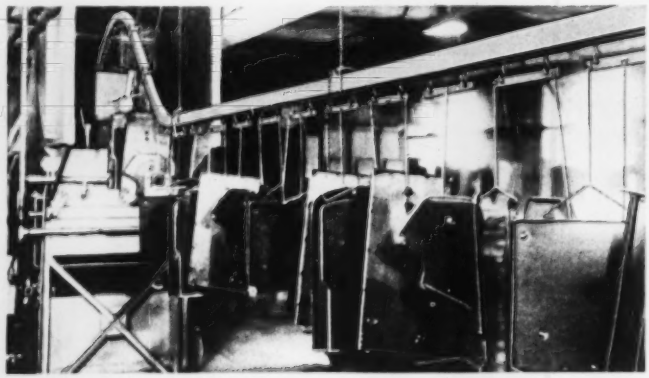
†March 22-April 6, Chicago International Trade Fair: Navy Pier, Chicago. Executive director: John N. Gage, Col., U.S.A., Ret. Address: Merchandise Mart, Chicago.

†March 23-27, Buffalo; March 30-April 3, Milwaukee—American Chemical Society: Annual spring meeting. Society address: 1155 16th St. NW, Washington 6. Executive secretary: Alden H. Emery.

†March 24-26, American Society of Mechanical Engineers: Spring meeting. University of Washington, Seattle. Society address: 29 W. 39th St., New York 18. Secretary: C. E. Davies.

†March 24-28, National Association of Power Engineers Inc.: National power conference and exhibit. Hotel Sherman, Chicago. Association address: 176 W. Adams St., Chicago. Secretary: A. F. Thompson.

For fast, sure, low-cost production it's *Richards-Wilcox* CONVEYORS



Efficiency—that's a word that means faster production, more profits for you. And efficiency is the word for Richards-Wilcox Conveying Equipment. R-W Conveyors speed up production by cutting down on handling time and releasing plant personnel for other jobs.

There's an R-W Conveyor for industry of all types—for handling of light, medium and heavy materials. You can boost production, cut costs and increase efficiency with Richards-Wilcox Conveying Equipment. Why not have an R-W consultant show you how you can lick your production problems with conveyor equipment engineered exactly to your own particular requirements. Just write or phone the nearest R-W branch office for free consultation—there's absolutely no obligation.

One of These Installations is Right for You

"ZIG-ZAG" Continuous Power Conveyors—Unique powered chain conveyor with extreme flexibility. Designed especially for carrying light loads within confined areas—handles products through degreasers, dip tanks, spray booths, ovens, etc., (shown above).

"LOCK-JOINT" Trolley Track Over-Way Conveyors—Designed for handling light to medium loads, and maximum flexibility. Maximum capacity 3,000 lbs.

"TRU-TRED" Steel Boom Over-Way Conveyors—for heavy duty handling and electric hoist service with minimum superstructure—eight different track sizes. Maximum capacity 8,000 lbs.

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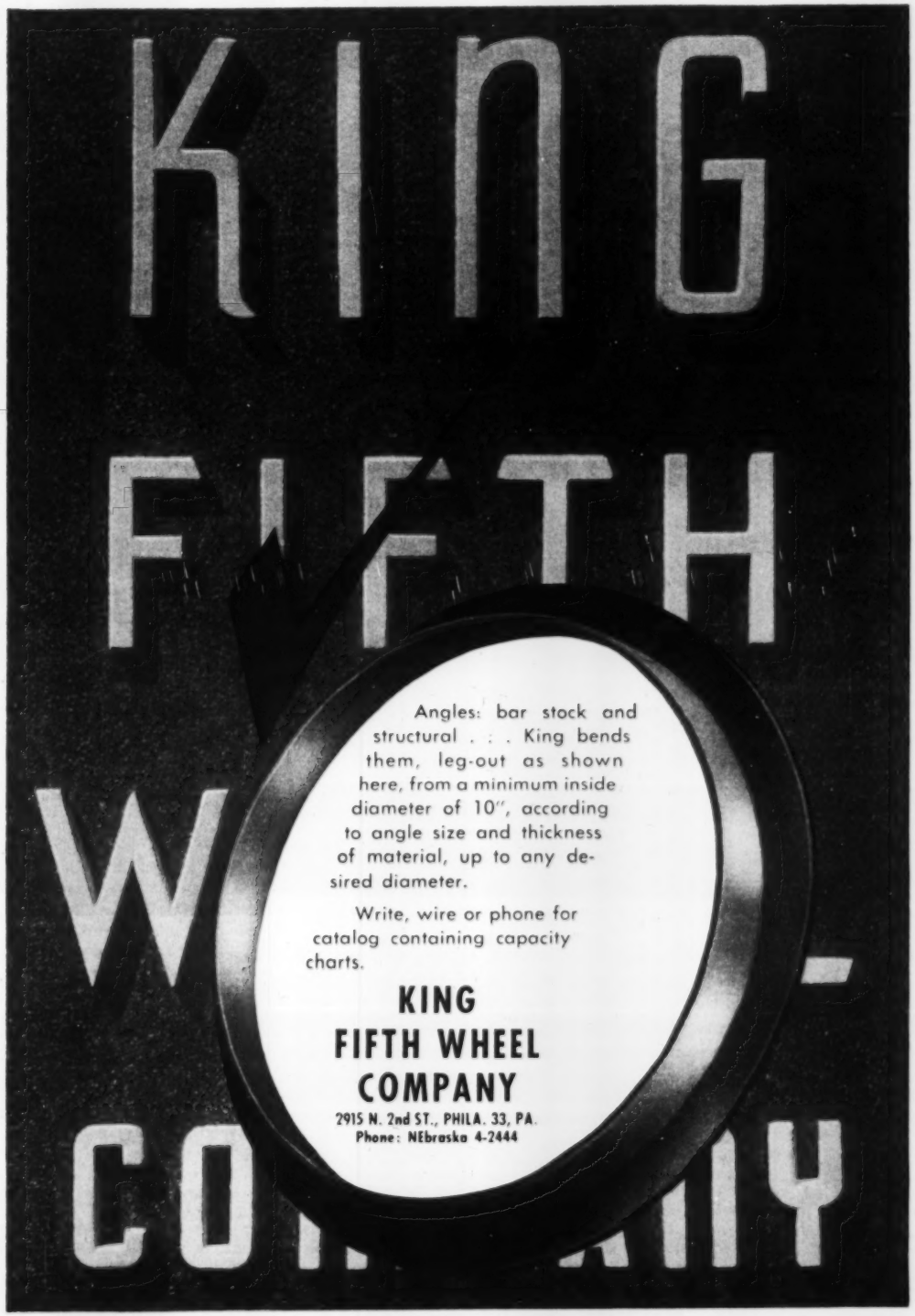

Angles: bar stock and structural . . . King bends them, leg-out as shown here, from a minimum inside diameter of 10", according to angle size and thickness of material, up to any desired diameter.

Write, wire or phone for catalog containing capacity charts.

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UNITED STATES STEEL

Toggle-Drawing Stamping Press

USE REPLY CARD—CIRCLE No. 1

Series of four-point, double-action, toggle-drawing presses is introduced by E. W. Bliss Co., Canton, O. Featuring rapid advance and return speeds, press is designed specifically to meet needs of industries making large-area,

. . . has rapid advance and return speeds

drawn stampings. Use of eddy current clutch provides quick approach to the work and slowdown to give proper drawing speed. Slowdown is accomplished by controlled slippage, through limit switches that can be adjusted to vary speed of any portion of the draw cycle.

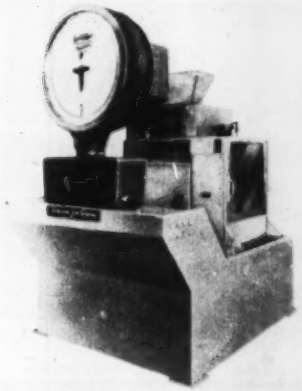
Crown contains four gears, totally enclosed with integral eccentrics for operating the plunger slide. All gearing and toggle bearings inside the crown are lubricated by a cascade oil system. Each main rockershaft is in one piece, easily removable from the top of the crown by unshrinking the rockershaft bearing cap tie-rods with Calrod units. Provision is made for pneumatic die cushions in the bed, or bed can be fitted with synchronized third motion if needed.

Scale Weighs Cumulatively

USE REPLY CARD—CIRCLE No. 2

Cumulative and consecutive weighing can be done automatically on the Select-O-Weigh, developed by Richardson Scale Co., Clifton, N. J. The unit provides complete flexibility in formula variations for all proportioning operations. Basic element is an electronic circuit with no arcing contacts, making it suited to explosion-proof installation. The company's standard type automatic scale is used as the weighing element; a pendulum dial scale acts as the force-measuring component.

Master control panel for any particular system is built to include one dial for each ingredient in the formulae handled. Sequence



. . . gains flexibility in formula variation

of adding materials and their timing are selectively controllable. Control circuits can be arranged to provide delivery of consecutive weights of varying amounts or to accumulate a total batch and discharge it to a hopper as a whole. Tare check circuits prevent the scale from initiating next weighing unless hopper is cleared.

Portable Laboratory Crusher

USE REPLY CARD—CIRCLE No. 3

Robert Holmes & Bros. Inc., Danville, Ill., offers a portable laboratory crusher designed to simplify coal sample preparation. Self-feeding hopper has damper-type gate, counter-weighted to remain in closed position. Gate is opened manually to feed sample to crushing chamber. After hopper is emptied, gate prevents material from being thrown back into hoppers.

Crushing chamber, opening horizontally at the center, is hinged at the back and locked at the front by a cam-type spring loaded lock. When opened, all working parts and screen are completely exposed for easy accessibility. Screen sizes available are $\frac{1}{8}$, 3/16, $\frac{1}{4}$, $\frac{3}{8}$ and $\frac{1}{2}$-inch diameter.

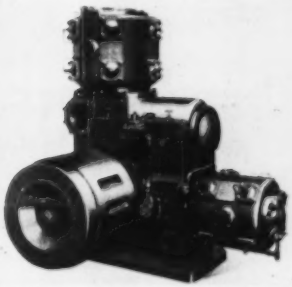
REPLY CARDS

on page 165 will bring you more information on any new products and equipment in this section.

Compressor System Redesigned

USE REPLY CARD—CIRCLE No. 4

Revised air compressor design is incorporated in a line of packaged-type, heavy-duty electric driven compressors developed by



. . . sizes are rated from 125 to 350 hp

Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. Sizes range from 125 to 350 hp for continuous full load service. Under two-stage compression, the unit reaches 80 to 125 psi discharge pressures. Designated XLE, its design embodies a single vertical low-pressure compression cylinder, a horizontal high-pressure cylinder and a synchronous motor mounted directly on the crankshaft.

Air enters and leaves the compressor through main air connections on the frame, instead of on cylinders. It is led both to and from both cylinders and intercool-

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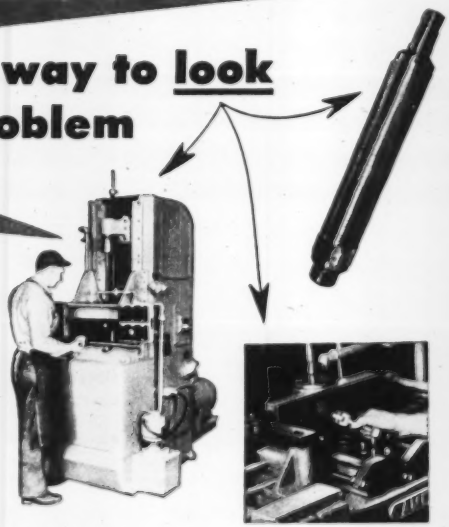
There's more than one way to look at your broaching problem



There are always *three* elements to consider in any broaching process . . . the machine . . . the broaches . . . the fixture to hold the work. Each, must be properly designed with the others in mind to obtain the greatest production at lowest cost.

Every broaching problem solved the American-Way *is* engineered with these three elements in mind . . . because American engineers are trained and experienced in the design of all three . . . machines . . . tools and fixtures.

So if you need broaches . . . machines . . . fixtures . . . take advantage of broach engineering the American-Way. You'll be sure of the right tools, the right machines, the right fixtures . . . every time. A part-print and process information are all we need. There's no obligation of course. Address Dept. S.

AMERICAN *American* BROACH & MACHINE CO.
A DIVISION OF SUNDSTRAND MACHINE TOOL CO.
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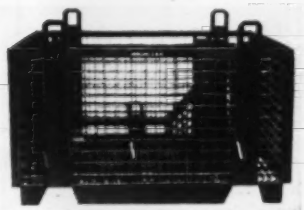
SUNDSTRAND

er through large passages within the frame itself. Intercooler's packaged design requires about one-quarter the conventional space. Bearings are full-floating and rotate freely both on the bearing journal and within the rod or bearing housing.

Tote Box Handles Hot Forgings

USE REPLY CARD—CIRCLE No. 5

Kerlow Steel Flooring Co., 222 Culver Ave., Jersey City 5, N. J., offers its standard tote box for handling hot forgings. Open steel-grating construction permits rapid cooling and facilitates cleaning. In addition, the use of high strength



. . . provides low weight-to-load ratio

steel with 85 per cent open construction provides a favorable low ratio of weight to load. Straps that carry the load help assure ease of tiering and moving by cranes. Units can be made by the company in any size or shape to meet users' individual specifications.

Two Lightweight Welders Added

USE REPLY CARD—CIRCLE No. 6

Two model GA Wasp direct current arc welders, made in 150 and 200 amp sizes, are announced by Air Reduction Sales Co., division of Air Reduction Co. Inc., 60 E. 42nd St., New York 17, N. Y. Designed as lightweight additions to the company's Wilson line, the models' volt-ampere characteristics make them suited to direct current straight polarity Heliwelding with Thor-Tung.

Advantages of self-excitation and split-pole, cross-field design provide acceptable operation at all current settings. Continuous overlap from each current range to the next gives a wide, unbroken range of welding current—30 to 250 on the 200 amp welder and 20 to 185 on the 150 amp unit. Because of lightweight construction, models are easily portable when mounted on a two-wheeled carriage.

Machine Works Cylinder Blocks

USE REPLY CARD—CIRCLE No. 7

Three-station manual transfer machine made by LeMaire Tool & Mfg. Co., 2657 S. Telegraph Rd., Dearborn, Mich., handles four different cylinder blocks through fixture changes and interchanging tools. It drills, spotfaces and taps eleven jet holes; drills seven oil holes from crankbore into oil gallery and mills seven main bearing insert lock grooves. Machine consists of three angular columns having No. 15 VS slide type drilling units at stations one and two, an 18-spindle drilling head at each station and a No. 10 slide unit at station three. The latter has an 11-spindle lead screw tapping head and seven-cutter milling unit.

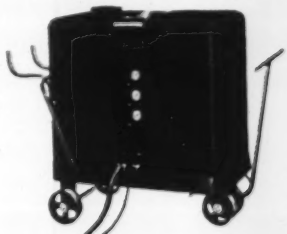
Three individual fixtures are ar-

Where the Clayton STEAM CLEANER hits... it's clean

★ Rinse as you clean, with one machine

★ Do more cleaning per hour at less cost

★ Safe, simple and trouble-free operation



Wherever the driving spray of properly balanced cleaning solution is directed by the Clayton Steam Cleaner gun...it's clean, instantly. Large surfaces or inaccessible corners surrender grit, grease and grime. Clayton cleaners lead the field in construction refinements and operating simplicity. The coupon invites comparison with any other equipment, or in competitive demonstration of performance.

Two reasons for mailing the coupon: Get a free copy of the book that tells you how to make real money on the wash rack, and arrange a demonstration of the *Clean and Rinse* Model HR Clayton Steam Cleaner.

CLAYTON MANUFACTURING CO. S 2
BOX 550, EL MONTE, CALIF.
Without obligation on our part, mail us a copy of your book on WASH-RACK PROFITS.

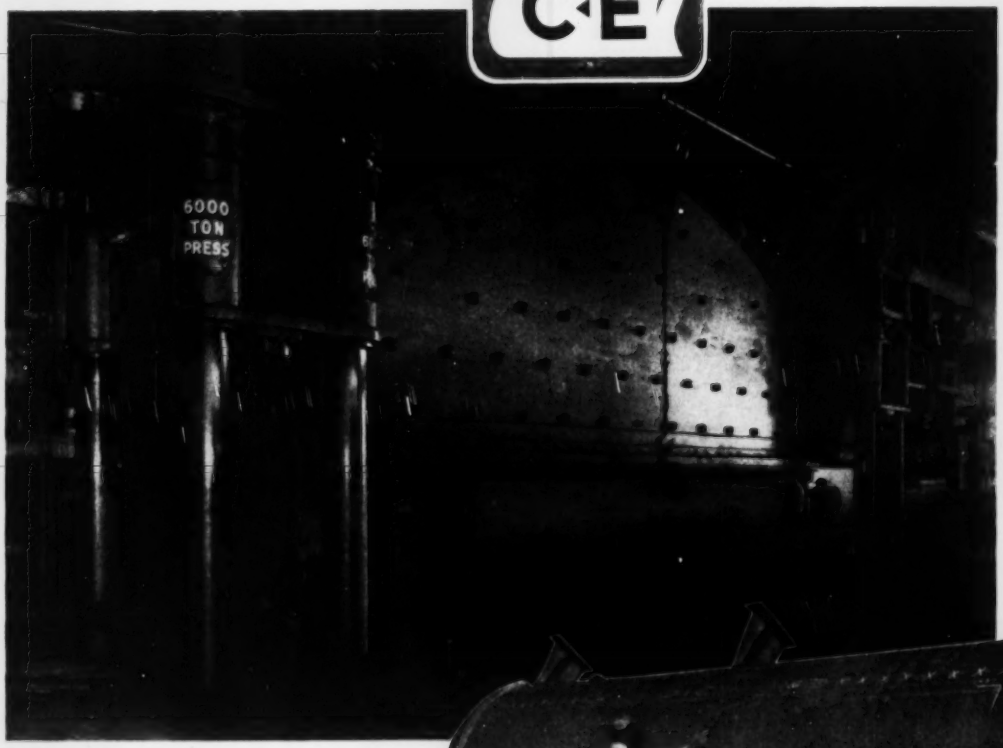
NAME_____

FIRM_____

ADDRESS_____

CITY_____ STATE_____

C·E cuts



The relentless 6000 ton pressure of this big Baldwin press easily bends 6-inch steel plates to the right curvature, while "joggling" feet on the press greatly simplify correct location under the ram.

Completed pressure vessel on layout table in Combustion Engineering's Chattanooga, Tenn. plant. Combustion has built high-pressure boiler drums with wall thicknesses up to 6".

BALDWIN BLH LIMA-HAMILTON

BALDWIN

production costs

with BALDWIN presses

Combustion Engineering-Superheater, Inc. is one of the world's largest manufacturers of steam generating equipment with some of its boilers as high as 15-story buildings.

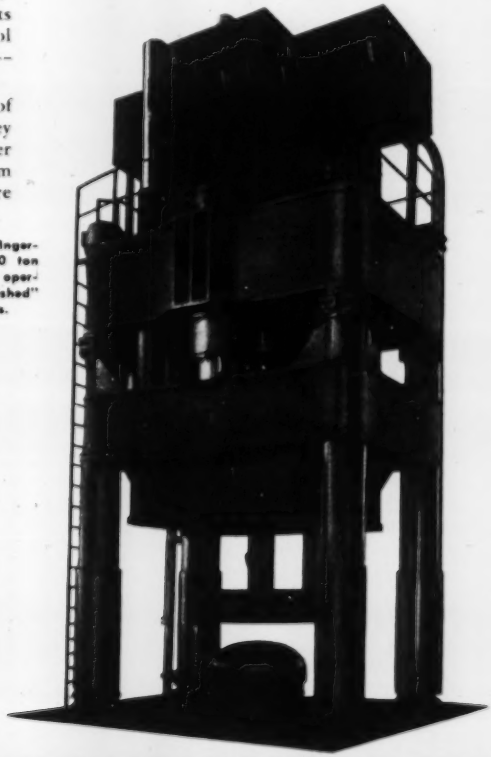
Forming plates for these big boilers, many with 6-inch steel walls, takes plenty of machinery muscle —an important reason why Baldwin presses are such favorites at Combustion Engineering. The new 2000 ton press, for instance, has already broken production records for forming the "dished" heads. Its smooth application of power and finger-tip control has paid off in far easier and *far faster* production—in appreciable reduction of manufacturing costs.

This experience of C-E exactly parallels that of hundreds of other companies. Consistently they find that Baldwin presses give greater output, fewer rejects and lower operating costs. Adjustable ram stroke—full pressure capacity throughout the entire stroke—simple die set-ups—all combine to save time and cut costs.

If you are considering the purchase of a new press, be sure to write for Baldwin Bulletins 285 and 286.

BALDWIN-LIMA-HAMILTON CORPORATION
Philadelphia 42, Pa.
Offices in Principal Cities

Servomechanisms give finger-tip control of this 2000 ton Baldwin press and speed operations in forming of the "dished" heads for pressure vessels.



-LIMA-HAMILTON

ranged with rollers so crankcase can be progressed by hand from station to station. Tapping head and milling unit are carried on a hydraulic feed slide that provides feed for the milling cutters. Machine produces about 17 parts per hour at 100 per cent efficiency.

Lift Ram Handles Coiled Wire

USE REPLY CARD—CIRCLE No. 8

Detachable 10-foot ram made by Baker Industrial Truck Division, Baker-Raulang Co., 1250 W. 80th St., Cleveland 2, O., provides efficient means for handling coiled wire. Ram can be installed on the truck carriage in a matter of seconds when needed for carrying wire from storage to drawing machines. At the drawing machine, ram is placed in the feeder, detached from the truck and left while wire is run off. Using this method, one truck and six rams keep three drawing machines going full time.

To pick up the attachment, operator moves his truck into position at ram's rear, raising the carriage so cradle arms engage a mounting spool on the back plate of the ram. To detach, it is positioned on supports and cradle and spool are easily disengaged by lowering the truck carriage.

R. D. WOOD

Hydraulic BENDING PRESS

THIS compact 30-ton horizontal hydraulic press fits productively into general shop use—in the bending and straightening of rods, bars, light structural sections, and for similar work. Self-contained, it is well designed and constructed, with a smooth tool finished 3' x 4' steel work table, and 9" x 18" ram and resistance heads, machine tee slotted for dies or bending forms. Distance between rams is adjustable in 4" increments from 1' to 3'. The press stands 2½' above the floor at the work table, and occupies an approximate floor space of 7'3" x 4'6". Higher capacities and various size tables can be furnished. Write, without obligation, to R. D. Wood Company for additional information.

HYDRAULIC PRESSES AND VALVES FOR ... INTENSIFIERS

R. D. Wood Company

ESTABLISHED 1803

Geared Roll Tube Straightener

USE REPLY CARD—CIRCLE No. 9

Mettler Machine Tool Inc., New Haven, Conn. offers its Shuster tube straightener, made to work thin walled tubing to 1-inch OD and solid bar stock to ½-inch diameter. Straightener is a two-way geared roll machine. Power driven feed rolls advance the tube through two sets of rolls, eight rolls to a plane. Tube does not rotate during passage. This prevents stock damage, such as spiralled burrs, and eliminates danger to operator due to rotating tubes.

. . . tubes do not rotate during passage

Rolls are designed to suit particular requirements. They can be supplied for square and hexagon, as well as round stock and tubing. Base motor drives rolls set in Timken bearings; idler rolls have needle bearings. Gear box is enclosed, with gears running in oil. Speed range of straightening reaches 250 fpm.

Portable Field Plotter

USE REPLY CARD—CIRCLE No. 10

Solution of two dimensional field problems is the function of the portable Analog field plotter, developed by Special Products Division, General Electric Co., Schenectady 5, N. Y. Electrical field patterns are set up in a thin conducting paper surface on the plotting board. Analogy between the electric field in the paper and re-

AN OPEN LETTER FROM STERLING BOLT CO.

regarding our present large and diversified stock of bolts, nuts and screws.

Sterling Bolt stocks of bolts, nuts and screws are more nearly complete now than they have been for some time past.

Our well equipped plant has on hand a large and varied supply of raw material for the prompt manufacturing of metal fastenings. These two important up-to-the-minute facts enable Sterling Bolt Company to make quick shipment of Sterling Bolt standardized nuts, bolts and screws—whose uniformity and dependability have served industry so well for more than thirty years.

Sterling Bolt offers you the combined advantages of both mill and warehouse, assuring you of *best* delivery on the *widest* assortment of material in the industry—no other bolt and nut supplier can even approach this service.

Don't be misled by "rush" stock lists compiled on the spur of the moment. Use the Sterling Bolt Catalog as the Sterling Bolt stock list with the full confidence that Sterling Bolt Company—serving industry throughout the nation—is the dependable, continuing single source for the nation's widest variety of bolts, nuts and screws.

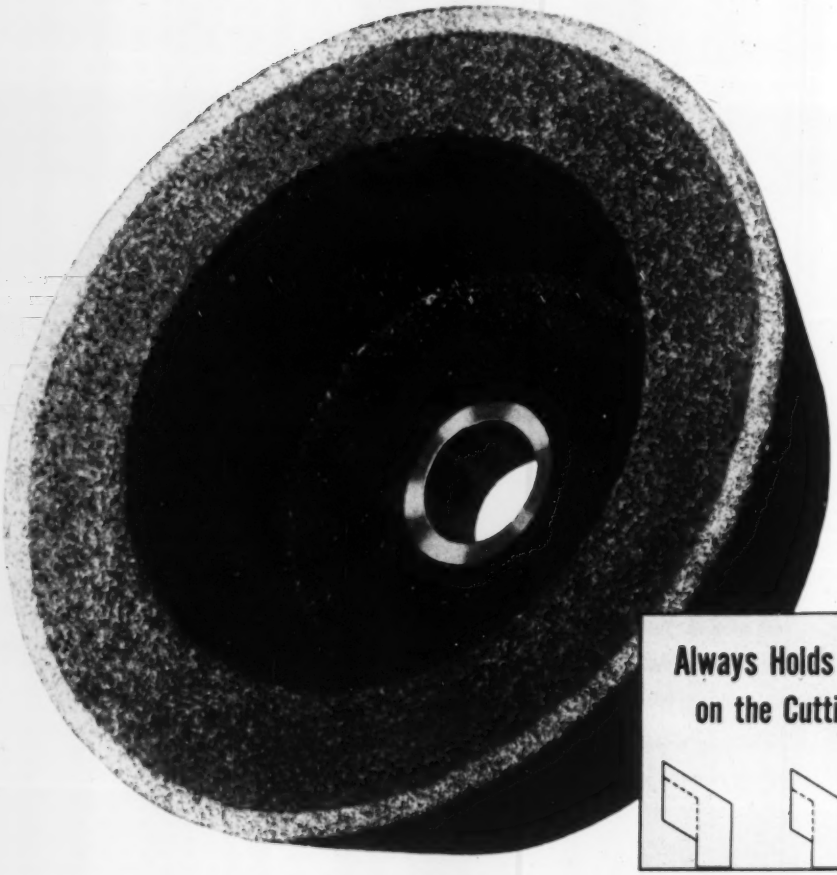
Send your inquiries and orders to Sterling Bolt Company today—where you get service spelled with a capital "SIR".

STERLING BOLT CO.

General Offices: 401 W. Erie Street Chicago 10, Illinois

Sales Offices: Cincinnati • Indianapolis • Milwaukee • St. Louis

How U. S. Rubber improved cup wheels



Always Holds its Shape on the Cutting Edge

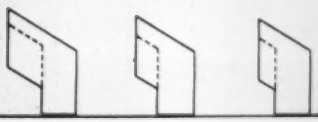


Diagram shows how the grinding face wears down evenly and the outer cutting edge remains sharp.

"U.S." technicians put an encircling rim, extra-tough and wear-resistant, around the free-cutting face of this Royalite® Hard-Shell Cup Wheel. As a result, the cutting edge does not become rounded. Hard-to-reach corners can be accurately ground because the edge does not break down. This free-cutting resinoid cup wheel retains its "true" shape throughout its entire service life.

Over 89 years' experience in the abrasive industry enables United States Rubber Company to solve all types of grinding problems. "U.S." engineers are always available for consultation. Write to address below.

PRODUCT OF

U.S.RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.

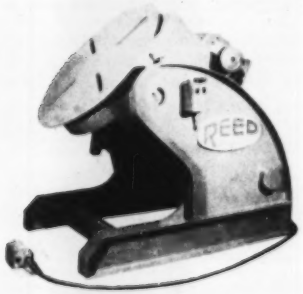
lated field problems permits rapid solution.

The plotter can be used for study of air-flow patterns, as well as electrical fields, fluid flow and temperature distribution. Because of this adaptability for air-flow pattern study, extensive use is expected in the aircraft industry. Plotter consists basically of a plotting board and exploratory stylus, a high accuracy multi-turn voltage divider, sensitive microammeter with specially designed overload protection.

Positioner Has Compact Frame

USE REPLY CARD—CIRCLE No. 11

Line of medium duty welding positioners introduced by Reed Engineering Co., Carthage, Mo., features compact table tilting frame replacing indirect, power transmission trains previously used. Standard model has a hand tilt



. . . rotation varies in a 10:1 speed range

system, using a totally enclosed, self-locking worm gear reducer. Rotation speed is varied through a 10:1 speed range by handwheel adjustment. Reeves Motodrive power unit has a 220-440 v, 3-phase, 60-cycle ac squirrel cage induction motor.

Two standard sizes available are models P-10R, with 100-pound capacity and P-25R with a 2500-pound capacity. Table is tilted through a 135-degree angle on both models. Both have tilt indicators. Power table tilting is optional.

Air Powered Drilling Unit

USE REPLY CARD—CIRCLE No. 12

Drilling capacity is ¼-inch and maximum stroke depth 4 inches on an air powered drill, the Hydrair, developed by Bellows Co.,

SHENANGO Centrifugal CASTINGS ... KEY TO SAVINGS

Typical of innumerable special shapes cast centrifugally by Shenango, these splined "star" rolls of Meehanite Metal are used to convey coated cloth and synthetic material through a hot fast-drying process.

Why these rolls will do a **better** job, **longer!**

WHEN symmetrical shapes, such as these "star" rolls, are cast *centrifugally* by Shenango, they gain qualities that can't be matched in ordinary castings.

For example, metal for metal there's pressure-dense grain for finer, smoother finish; higher tensile to better resist stress and impact; freedom from sand inclusions, blow holes and other hidden defects to reduce rejects and avoid costly, unexpected failure.

So, when it comes to symmetrical shapes, large or small, ferrous or non-ferrous, you'll always be time and money ahead when you specify Shenango *centrifugal* castings . . . either rough or precision finished in the modern Shenango shops.

HELPFUL BULLETINS

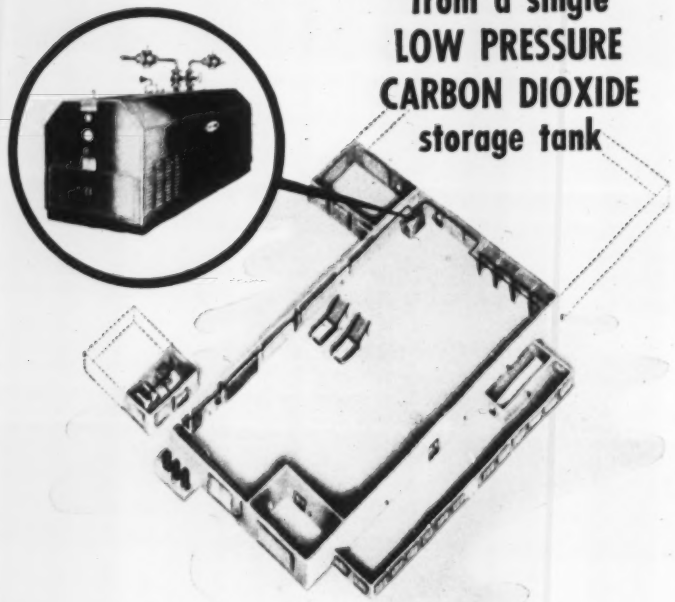
Bulletin No. 150 covers Shenango non-ferrous centrifugally cast parts; Bulletin No. 151 for parts of Meehanite Metal, Ni-Resist and other special iron alloys. Either or both are yours for the asking.

SHENANGO-PENN MOLD COMPANY
491 West Third Street • Dover, Ohio
Executive Offices: Pittsburgh, Pa.

SHENANGO
ALL RED BRONZES • MANGANESE BRONZES • ALUMINUM BRONZES
MONEL METAL • NI-RESIST • MEEHANITE METAL

Expansible Firesafety

from a single LOW PRESSURE CARBON DIOXIDE storage tank



When expanding your plant, you can't afford to wait for additional fire protection ... you need the proper amount at once. However today, material priority regulations slow you up considerably ... these delays hold back vital production and resulting revenue. Install a C-O-TWO Low Pressure Carbon Dioxide Type Fire Extinguishing System in your plant now and new construction to come will be firesafe from the start.

With a C-O-TWO Low Pressure Carbon Dioxide Type Fire Extinguishing System, simple piping, running from one centrally located storage tank, instantly transports clean, non-damaging, non-conducting carbon dioxide anywhere in the plant area ... to flammable liquids, electrical equipment, storage spaces, manufacturing processes and record vaults. Fire at any protected location is extinguished in seconds with an absolute minimum of expense and interruption.

Future plant expansion is quickly and economically provided for by initially installing an oversized low pressure carbon dioxide storage tank ... capacities range from one to fifty tons. Discharge facilities can be either manual mechanical, manual electric, automatic mechanical, automatic electric or a combination of these ... all are easily extensible at a later date.

Don't take chances with future delayed installations; secure the benefits of highly efficient fire protection engineering today ... our extensive experience over the years is at your disposal without obligation. Get the facts now!

C-O-TWO

C-O-TWO FIRE EQUIPMENT COMPANY

NEWARK 1 • NEW JERSEY

Sales and Service in the Principal Cities of United States and Canada

Affiliated with Pyrene Manufacturing Company

MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeez-Grip Carbon Dioxide Type Fire Extinguishers • Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
Built-In Smoke and Heat Fire Detecting Systems

Akron, O. Drill is controlled electrically, but air powered with feed rate controlled hydraulically. Drill's controls permit rapid advance, controlled feeding through the work and rapid return.

Standard spindle rated free speed is 2800 rpm; maximum of about 1/3-hp is developed at 1500 rpm. Five optional speed ranges, adaptable to varying materials worked, are 17,000, 5000, 1450, 850 and 500 rpm. Spindle travel is powered by the company's air motor built-in, electrically controlled valve. Feed rate is adjustable from 0 to 200 inches per minute at 90 pounds of air.

Sector Gear Controls Indexing

USE REPLY CARD—CIRCLE No. 13

Loads are moved from station to station within 3/5-second indexing time on a mechanical indexing table, called Hautau-Turndex, made by Turner Bros. Inc., 2625 Hilton Rd., Ferndale, Mich. Uniform gear tooth area of a master sector gear controls all cycles, establishing the table's basic accuracy. Cams that control the master gear sector directly govern acceleration and deceleration. Action results in control of abrupt starting, stopping and catapulting and works to maintain maximum production speed.

Standard units are available with two to 26 stations, in any equal division of 360 degrees. Tables can be applied as a driving unit for indexing larger rotary tables to 12 feet diameter.

Automatic Feed for Presses

USE REPLY CARD—CIRCLE No. 14

Producto Machine Co., Bridgeport, Conn., offers Surefeed, an automatic feed for stamping presses that is easy to mount and quickly set up for required feed length. It mounts directly on the die set, no press attachments or alterations are required. It accommodates stock up to 2 inches wide and 0.045-inch thick.

Small-Sized Magnetic Chucks

USE REPLY CARD—CIRCLE No. 15

Two small-sized magnetic chucks, available from Viking Industries, Rockford, Ill., have small rectangular steel surface plates

BUILD THEM BETTER

WITH SHAKEPROOF® Lock Washers

Multiple tapered-twisted teeth bite deeply to resist vibration loosening—lock even tighter as vibration increases!

EXTERNAL | INTERNAL | COUNTERSUNK | EXTERNAL INTERNAL

A size and type to meet your specific fastening need!

DOME PLAIN PERIPHERY | DOME TOOTHED PERIPHERY | DISHED PLAIN PERIPHERY | DISHED TOOTHED PERIPHERY

SEND FOR FREE SAMPLE KIT, TODAY!

Make your own tests . . . see how every fastening can be positively locked against the hazard of vibration loosening. Ask for Sample Kit No. 21.

KEPS

SEMS

For maximum manufacturing efficiency, SHAKEPROOF Lock Washers are available pre-assembled to screws (SEMS) or nuts (KEPS).

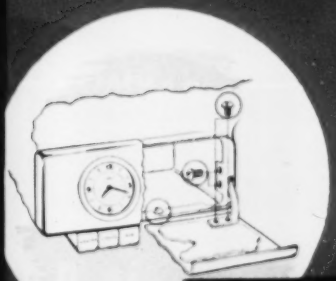
SHAKEPROOF inc.

"Fastening Headquarters"

DIVISION OF ILLINOIS TOOL WORKS

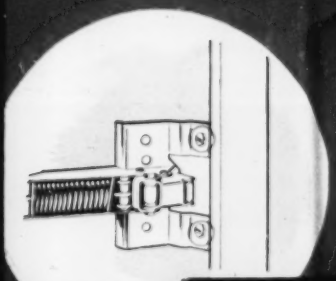
St. Charles Road, Elgin, Illinois

In Canada, Canada Illinois Tools Ltd., Toronto, Ont.



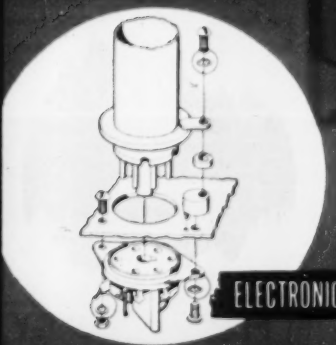
AUTOMOBILES

Here SHAKEPROOF Lock Washers are used to lock glove compartment assembly fastenings tight . . . positive protection against vibration loosening and the abuse of frequent slamming.



REFRIGERATORS

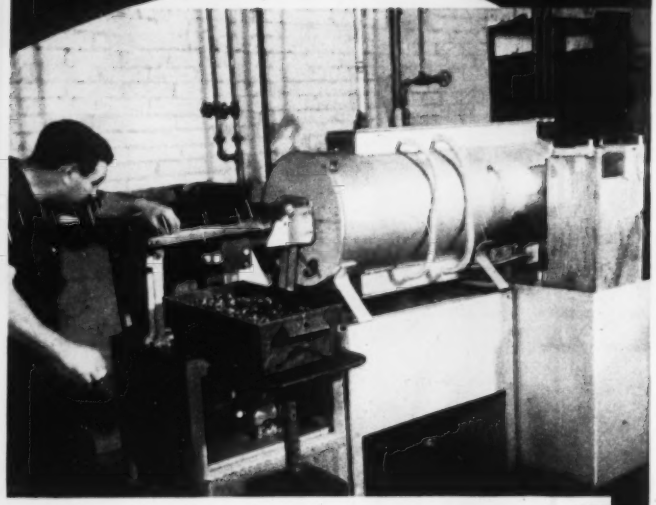
This refrigerator door latch mechanism is carefully adjusted for proper closing action. SHAKEPROOF Lock Washers hold the fastenings tight and prevent shifting of the assembly in service.



ELECTRONICS

This application is typical of the extensive use of SHAKEPROOF Lock Washers in electrical and electronic assemblies of all kinds, protecting vital fastenings against loosening and assuring efficient electrical grounding.

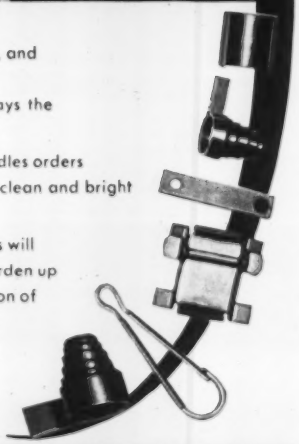
RAYMOND MFG. CO.
"Bright" Hardens Precision Springs in a HEVI DUTY Shaker Hearth FURNACE



"We bright harden carbon, vanadium, and stainless steel springs without distortion in our Hevi Duty Shaker Hearth furnace," says the Raymond Mfg. Co. of Corry, Pennsylvania.

"Our Hevi Duty Shaker Hearth furnace handles orders faster, and work comes out of the furnace clean and bright with no scale or decarburization."

Hevi Duty standard Shaker Hearth Furnaces will carburize, nitride, dry cyanide or bright harden up to 150 lbs. of small parts per hour. Operation of this production machine is semi-automatic. Write for bulletin HD-850 today.



HEVI DUTY

HEVI DUTY ELECTRIC COMPANY
MILWAUKEE 1, WISCONSIN
Heat Treating Furnaces... Electric Exclusively
Dry Type Transformers *Constant Current Regulators*

precision ground parallel with the mounting base. Base has two opposed flanges drilled and countersunk for Allen head screws. Units will not arc across and are cool operating.

No Punch Holder Binding

USE REPLY CARD—CIRCLE No. 16

To eliminate punch holder binding in separating die sets, a removable cap guide pin is offered by Superior Steel Products Corp., Milwaukee, Wis. With the guide pins, punch holder is freed on the uppermost part of the pins where it is most likely to tilt and bind. Removing detachable caps allows freedom of movement at this point.

Combustible Gas Alarm

USE REPLY CARD—CIRCLE No. 17

Model EE combustible gas alarm, developed by Johnson-Williams Ltd., Palo Alto, Calif., has completely explosion-proof construction and can be installed directly in the suspected atmosphere. Presence of explosive vapors is signalled by a bright red indicator light as well as by remote alarm units of various types that can be connected to terminals.

Aids Static Balancing

USE REPLY CARD—CIRCLE No. 18

Speedi-Balancer, offered by Anderson Bros. Mfg. Co., Rockford, Ill., is used in conjunction with polishing, grinding and buffing lathes. Wheels can be removed and replaced without adding or removing weights. Devices are made to fit arbor sizes from $\frac{1}{2}$ to $\frac{7}{8}$-inch and from 1 to $1\frac{1}{4}$ inches.

Chain for Conveyors

USE REPLY CARD—CIRCLE No. 19

Type HP chain, made by Acmor Conveyor Chain Co., Bedford, O., is available in either a steel roller or bushing type in 2, $2\frac{1}{2}$, 3 and 4-inch pitch. Stock attachments are available for all pitches which are either bolted or welded to the chain proper.

Chuck for Hand Operations

USE REPLY CARD—CIRCLE No. 20

Lehigh hand collet chuck, announced by Spring Specialties Co., Maywood, Ill., is designed to hold such tools as rotary files, mount-

A Statement by Anaconda on the Copper Situation

MANY users of copper have vital decisions to make . . . usually in connection with the present defense-induced shortages of copper and aluminum. This statement is an effort to remove the smoke screen surrounding the copper picture . . . to wipe away the confusion caused by too much talk supported by too few facts.

Substitution poses problems – Industry has been urged to substitute aluminum and other materials for copper. In some instances this may be logical and practicable. In many others it is difficult, if not impossible. But – before making *any* long-term decisions that may cost a great deal of money in engineering, new plant facilities or rescheduling of production operations – one should know the facts about the future of copper.

New Anaconda projects – The first major increase in copper production will come from Anaconda when the Greater Butte Project and the new Sulphide Plant at Chuquicamata, Chile, begin operations this spring. By 1953, these two projects should raise present levels of copper production by about 95,000 tons yearly.

Toward the close of 1953, Anaconda's new Yerington project in Nevada is expected to start producing at an annual rate of 30,000 tons. By then, Anaconda will be adding to the present yearly copper supply at the rate of about 125,000 tons.

Other new projects – During 1954-55 still other new projects in the U. S. and friendly foreign countries will further augment the increasing copper supply. All told, it is estimated that by 1955, not less than 450,000 tons of copper could be produced annually – over and above present production levels.

Accordingly, in 1955-56, domestic production plus imports could bring the U. S. copper supply to 1,800,000 tons yearly. This would represent an increase of about 20% over present levels. Based on historical comparisons, and barring a large-scale shooting war, this amount of copper could support a Federal Reserve Board Index of Industrial Production of 270, an increase of 24% over the present, and 45% above the first half of 1950.

• • •

These are the 'things to come' in copper. On the basis of the facts there is no necessity for considering long-range substitution of other materials for the red metal.

52320A

ANACONDA
COPPER MINING COMPANY

The American Brass Company
Anaconda Wire & Cable Company
International Smelting and Refining Company
Andes Copper Mining Company
Chile Copper Company
Greene Cananea Copper Company

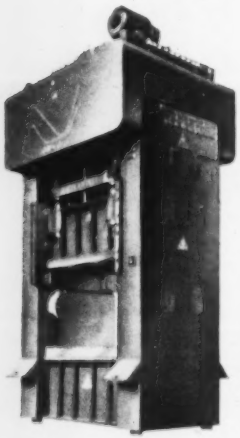
PRODUCERS OF: Copper, Zinc, Lead, Silver, Gold, Cadmium, Vanadium, Superphosphate, Manganese Ore, Ferromanganese.
MANUFACTURERS OF: Electrical Wires and Cables, Copper, Brass, Bronze and other Copper Alloys in such forms as Sheet, Plate, Tube, Pipe, Rod, Wire, Forgings, Stampings, Extrusions, Flexible Metal Hose and Tubing.

advice to city fellers from Farmer Brown

As an expert in production or mass marketing Henry Brown couldn't qualify for a job in the smallest manufacturing concern, yet he knows something that no industrial manager can afford to overlook.

Long observation has taught him that the smooth, lighter weight pieces which you and I recognize as stamped or drawn, are usually more durable and as a rule cost him less. He doesn't care how a part was made, but he wants the toughness, the convenient streamlining, the absence of dead weight, the attractive price which are inherent in the products of the metal forming press.

If you sell metal articles or parts, this preference is important. Should conditions become more competitive, with people harder pressed for cash, it will be even more so. Now, when you're planning for possible tougher years to come, investigate up-to-date press methods applied to your problems. Consult a Clearing engineer before you take another step. There's no obligation.



CLEARING PRESSES

THE WAY TO EFFICIENT MASS PRODUCTION

CLEARING MACHINE CORPORATION

8499 WEST 65th STREET • CHICAGO 38, ILL.

HAMILTON DIVISION, HAMILTON, OHIO

ed points, abrasive disks, polishing buffs and felts, all types of screwdrivers, hand nut setters and scrapers. Special tools with round shanks of 1/4, 3/16, 1/8 or 3/32-inch diameters can also be held.

High Accuracy Tachometers

USE REPLY CARD—CIRCLE No. 21

Extremely high accuracy, 1/4-per cent of any speed being measured, is guaranteed with the tachometers available from Metron Instrument Co., Denver 9, Colo. Accuracy is sustained by calibration adjustments mounted on the front of the instrument. Ten overlapping and adjoining ranges provide more than a 10 to 1 spread in speed.

Stamps Name Plates

USE REPLY CARD—CIRCLE No. 22

A tool for stamping of plain, etched or embossed name plates is offered by Numberall Stamp & Tool Co., Staten Island 12, N. Y. It is used in a small kick or power press or the company's No. 93 or No. 131 bench press. All lines are stamped in one operation.

Sealed Selenium Rectifiers

USE REPLY CARD—CIRCLE No. 23

International Rectifier Corp., El Segundo, Calif., announces a line of hermetically sealed selenium rectifiers in metal cases filled with inert gas and provided with standard tube terminals to fit standard sockets.

Cylinders with Cushion Sealing

USE REPLY CARD—CIRCLE No. 24

Super Cushion air cylinder designed with an application of flexible cushion sealing is announced by Tomkins-Johnson Co., Jackson, Mich. It eliminates binding and sticking and operates with low friction, minimum wear and added power. A new type of packing

USE A **REPLY CARD**

Just circle the corresponding number of any item in this section for more information.

Yours FOR THE ASKING

TEAR OUT CARD, FILL IN and MAIL TODAY!

73. Flow Meters

Bristol Co.—Instruments for recording, integrating, indicating, automatic controlling and telemetering the flow of steam, water, air, gas, oil, solutions and other fluids are described in 40-page catalog F1605. Both mechanical and electric type flow meters are pictured and their operation explained. Typical methods of applying instruments in industrial and process plants are shown.

74. Permanent Magnets

General Electric Co., Carboloy Dept. —Whatever type of permanent magnet is needed, you'll find it in 20-page illustrated bulletin PM-100 entitled "Stocked Carboloy Alnico Permanent Magnets." Properties of both cast and sintered Alnico are listed, as are approximate tolerances, available shapes and sizes, and application information.

75. Power Booster & Stacker

Industrial Engineering & Mfg. Co. —Complete information relative to the Universal 600-U series power booster-stacker for loading, unloading, stacking, boosting and horizontal conveying of boxes, bags or cartons is contained in 4-page folder. Models having 12, 14 and 16-ft troughs are available with belt speed of 54 fpm.

76. Industrial Instruments

Minneapolis Regulator Co., Brown Instruments Div.—Because of the ease with which Brown ElectroniK potentiometers can be modified for measuring many variables other than temperature, detailed data on the Continuous Balance System is presented in Bulletin No. B15-12. Amplifier detects a small dc error signal from instrument measuring circuit, converts it to ac and amplifies it sufficiently to drive companion motor of unit.

77. Specialized Spring Steels

Sandvik Steel, Inc.—32-page catalog No. 50 lists 785 sizes of cold-rolled spring steels along with such data as thickness, width, degree of hardness, type of edges, finish and weight per hundred lineal feet for each size. Weights of strip steel, comparative table of wire gages, numerical conversion tables, hardness and temperature conversion tables are included. You'll also find background information on company, ordering instructions and list of specialized applications.

78. Slitting Lines

Yoder Co.—If your production involves slitting either coils or sheets, you'll find some practical and technical guidance in 80-page handbook "Multiple Rotary Slitting Lines." Well illustrated and crammed with basic information, this book also presents specifications and capacities on line of uncoilers, slitters, recoilers, scrap choppers and coil cars. Design, selection and operation data are included.

79. Industrial Crane Trucks

Baker-Raulang Co., Baker Industrial Truck Div.—Extremely versatile Baker crane trucks which combine travel, hoisting, booming and slewing operations in sturdy compact machine are detailed in 6-page folder 1613. Two units have capacities of 6000 and 10,000 lb, have five travel speeds forward and reverse and are powered by industrial battery. All controls are conveniently located to operator.

STEEL
Penton Building, Cleveland 13, Ohio

2-16-52

Please send literature or detailed information on subjects circled at left to—

NAME _____ TITLE _____

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PRODUCTS MANUFACTURED _____

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80. Oscillating Conveyors

Link-Belt Co.—This 24-page well illustrated booklet No. 2444 will give you pertinent information on Positive Action oscillating conveyors for conveying, feeding, cooling and screening a variety of loose bulk materials. Dimensions, weights and capacity and horsepower charts for both heavy and light duty models are presented. Handling capacities range from few pounds to several hundred tons per hour.

81. Steam Cleaning Techniques

Clayton Mfg. Co.—"A Plan to Link Wash-Rack Operation With Profits" is title of informative 20-page guide to parts and equipment cleaning. Use of Kerrick steam Kleaner in automotive wash-rack areas for removing grease, dirt and other contamination from cars and trucks is explained. Cleaner is also usable for industrial maintenance operations.

82. Refractories

Johns-Manville—Recently published 12-page illustrated brochure entitled "Hydraulic Setting Refractories" presents readers with data on five J-M Firecrete products for casting special refractory shapes and three J-M Blazecrete products for gunning and slap troweling applications. Refractories are for services through 3000° F.

83. Canvas Belting

C. R. Daniels, Inc.—Technical problems involving the selection and application of stitched canvas conveyor and elevator belting are answered in new belting catalog. In addition to providing complete data on available types and sizes, book also suggests ways to cut costs through proper maintenance procedures. Eight specific types of belts are offered for handling various products, whether hot, cold, abrasive or heavy.

84. Conveyor Analysis Forms

Logan Co.—Company is offering sample sets of conveyor analysis forms which are designed to help you analyze your handling problem, locate new sources of production efficiency through better handling and to estimate present handling costs. Bulletin describing forms also pictures some conveyor installations.

85. Alloy Welding Fittings

Key Co.—Line of Key-Kast alloy steel welding fittings is featured in this 4-page illustrated bulletin K.S.-1-52. Fittings are designed with heavy wall thickness throughout for structural strength and extra thickness at critical areas for allowance against corrosion. Available alloys are listed.

86. Precision Drilling-Tapping

Hamilton Tool Co.—Super-sensitive precision drilling and tapping machines are subject of 2-page data sheet GL-152. Varimatic drills have capacity of 0.004 to 5/16-in. and model AM covers range of 0.004 to ¼-in. Tapping machine handles from 10/32 to smallest available sizes of taps.

EDITORIAL REPRINTS:

87. Who's Who in Defense

If you find it necessary to contact key government defense personnel on matters pertinent to your segment of metalworking, you'll find this directory entitled "Who's Who in the Defense Organization" very helpful. Names were obtained from Office of Defense Mobilization and compiled by STEEL according to the various agencies.

88. Metal Working Data

Now available to STEEL readers in reprint form is the 48-page fourth edition of "Metalworking Facts & Figures" which tabulates latest statistics. Contents trace raw materials all the way through to end products of metal consuming industries. Related subjects such as labor, prices, and earnings are covered as well.

89. High Strength Bolts

Here's a reprint of an article entitled "High Strength Bolts" which appeared in STEEL's December 24th issue. It points out advantages and long range economy of using bolts in structural work. Classes of structures considered are those subjected to fluctuating dynamic loading, such as bridges and certain industrial equipment, and those subjected to static loading.

90. Future for Metalworking

Reprint entitled "Metalworking's Destiny" forcefully points to the gradual loss of industry's most valuable asset—the incentive to produce. Editorial, however, optimistically sets forth broad, far-reaching steps nation must take to restore this incentive and to realize its industrial destiny.

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5	15	25	35	45	55	65	75	85	
6	16	26	36	46	56	66	76	86	
7	17	27	37	47	57	67	77	87	
8	18	28	38	48	58	68	78	88	
9	19	29	39	49	59	69	79	89	
10	20	30	40	50	60	70	80	90	

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nut that adds rod bearing length and eliminates separate female adaptor ring is featured.

Tongs with Adjustable Handles

USE REPLY CARD—CIRCLE No. 25

Lightweight safety tongs with adjustable handles to provide flexibility for press and shear feeding operations are offered by Magline Inc., Pinconning, Mich. Tension at points of adjustment is automatically maintained. Made of specially alloyed magnesium, devices are designed to crush if accidentally caught within the die opening, thus preventing damage to die.

Hub-Type Grinding Wheel

USE REPLY CARD—CIRCLE No. 26

Norton Co., Worcester Mass., announces a reinforced, flexible, hub-type grinding wheel known as BFR wheel. Using this wheel an operator can rough grind, finish grind and notch. Designed for use on right angle or sander type portable grinders, it is made of carded web material impregnated with abrasive grain.

Oxygen Indicator

USE REPLY CARD—CIRCLE No. 27

Type C-2 oxygen indicator, developed by Mine Safety Appliances Co., Pittsburgh, Pa., measures the oxygen content of inert and combustible atmospheres in chemical and metallurgical industries. Direct readings to within 2 per cent of the selected scale range may be obtained.

Nuts Hold Grip at 550° F

USE REPLY CARD—CIRCLE No. 28

Flexloc locknuts manufactured by Standard Pressed Steel Co Jenkintown, Pa., can be used continuously in temperatures a. hi as 550° F. Top of the nut is slotted into six flexible segments. When nut is run on a bolt or other thr ad-ed member, segments grip threads with an action similar to that of the jaws of a chuck.

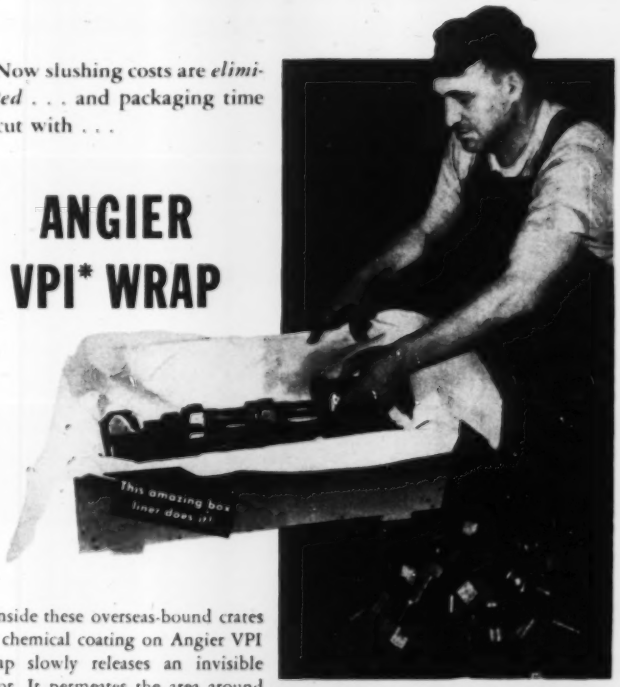
USE A REPLY CARD

Just circle the corresponding number of any item in this section for more information.

Vapor-from-Paper STOPS RUST

Now slushing costs are *eliminated* . . . and packaging time is cut with . . .

ANGIER VPI* WRAP



Inside these overseas-bound crates the chemical coating on Angier VPI Wrap slowly releases an invisible vapor. It permeates the area around these rolling mill parts . . . prevents rust almost like magic! So effective is this proven vapor rust preventive that rejects due to rust are eliminated. Slushing in grease or oil is not necessary—this means "cleaning" costs for customers are eliminated! Substantial savings in packaging time for VPI-users is an obvious fact!

For facts that tell how *you* can ship and store metal articles or parts RUST-FREE at less cost . . . write today to:

*Reg. U. S. Pat. Off. Vapor rust preventive

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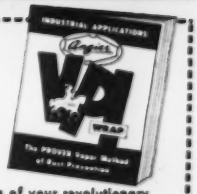


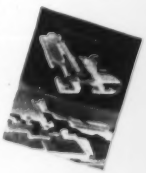
Send case studies of your revolutionary vapor rust preventive TO:

...CAST BY STALWART RUBBER PARTS

Reaches into every field of industry! STALWART custom-engineered rubber parts are providing dependable performance in **aircraft, automobiles, trucks, marine equipment, railroad rolling stock, electrical assemblies** and other types of equipment.

STALWART mass-produces precision parts from special stocks which have been developed for maximum resistance to extreme temperatures, oil and gasoline, chemical action, abrasion or weather. These parts retain their inherent properties despite exposure to severe service conditions.

STALWART is prepared to supply molded, extruded, lathe-cut, die-cut, and mandrel-built rubber parts engineered to meet the requirements of specific applications. They can meet **individual** as well as **S.A.E.** and **A.S.T.M.** specifications.



Write today for illustrated Catalog No. 51SR-1

STALWART RUBBER COMPANY

200 Northfield Road • Bedford, Ohio

The Market Outlook

SIGNS of loosening steel supplies continue to increase. Further easing in demand for the light, flat-rolled products and certain specialties is in evidence. Tin plate requirements are less pressing. Tool steel now can be had from some producers in 4 to 6 weeks. Merchant pig iron and coke are displaying more sluggishness as foundry operations taper in step with slipping consumer durable goods trade. Cast iron scrap is almost a drug on the market at some points, isolated reports of freight concessions being heard as dealers seek to move tonnage. Pressure for decontrol of distribution is mounting and it would not be surprising if control authorities moved in that direction shortly.

SUPPLY— While procurement conditions are definitely easier in some products, do not get the mistaken notion that steel is in surplus supply. Such is not the case. Over-all supply-demand balance is still months distant. In fact, at this stage there is no telling the exact status of potential demand as related to supply. Some trade authorities think whatever slack has appeared to date would vanish quickly under a rush of demand now artificially restricted should certain governmental limitations on use be lifted. Others are not so certain. In any event, the mills are heavily booked through second quarter and indications are they will enter third quarter with substantial carryover tonnage in certain products. Even though defense requirements should begin to level off steelmakers think it will be third quarter at earliest before such begins to show up. Atomic energy needs still are rising and efforts are being made to activate other programs on a higher level. All of which means new pressure for steel.

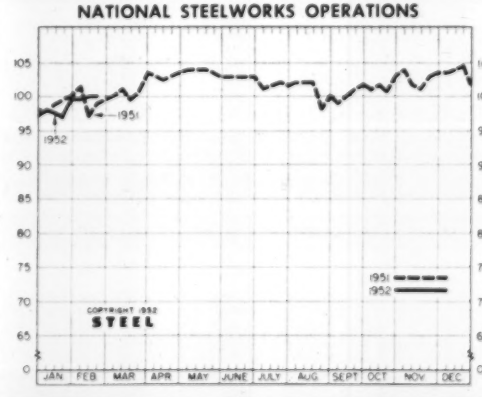
PRODUCTS— Despite further easing in demand for sheets and strip there is as yet no indication much raw steel will be diverted from these items to products in stronger demand before midyear. Spot openings in sheet rolling schedules, while more numerous, are being filled quickly. Structural steel activity is lagging. Fabricators are competing sharply for government-approved work. Control authorities are being pressed to lift restrictions on commercial construction to assure high-level activity through the second half of the year. Heavy gage plates are in stringent supply and there is little prospect for any early improvement. Lighter gages are more freely available due to larger tonnage from the continuous mills. However, renewed tightening may develop here soon with seasonal demand for fuel oil tanks, domestic and commercial installations in the offing. No easing in pressure for carbon bars is apparent. Producers confront more tonnage demands than they can accept and CMP tickets are hunting takers. Cold-drawn bar makers are deluged with orders, including special directives for military needs which necessitate considerable revision in schedules.

SCRAP— Some slight improvement in scrap supply is attending abnormally moderate weather conditions over most of the nation. Supply continues critical but more tonnage is moving and with a good portion of the winter past steelmakers are encouraged to hope they will be able to maintain capacity production without interruption. So far this winter relatively little steel has been lost for lack of scrap. Through the concerted efforts of the scrap trade and steel producers, along with excellent allocation by government scrap authorities, furnace shutdowns have been held to a minimum. More scrap is coming from the auto graveyards and the flow from this direction is expected to increase over the next few weeks. Meanwhile, the slowing down of foundry operations is reflected in sluggish demand for cast scrap. This is resulting in an easier price tone.

PRODUCTION— Steelmaking operations held unchanged at 100 per cent of capacity last week. Sporadic labor trouble has been preventing the industry from attaining higher operating levels of late.

PRICES— Iron and steel product price schedules continue unchanged. STEEL's weighted index on finished steel holds at 171.92 as does the arithmetical price composite at $106.32.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Feb. 16	Change	Same Week 1951	Same Week 1950
Pittsburgh	101	+ 0.5*	99.5	95.5
Chicago	101.5	0.5	101	98.5
Mid-Atlantic	99	0	99.5	75
Youngstown	102	0	106	99
Wheeling	99	— 1	97	91
Cleveland	98.5	+ 0.5	86.5	99
Buffalo	104	0	104	101.5
Birmingham	104	0	100	82
New England	88	— 2	90	80
Cincinnati	99	+ 13	102	101
St. Louis	77.5	— 7.5	95	77.5
Detroit	101.5	— 4.5	108	103
Western	104	+ 4	100.5	85.5
Estimated national rate	100	0	99	90

Based on weekly steelmaking capacity of 2,082,617 tons in 1952; 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950.

*Change from revised rate for preceding week.

The Metalworking Outlook—p. 57 Production-Engineering News—p. 93

Composite Market Averages

FINISHED STEEL INDEX, Weighted	Feb. 14 1952	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av. = 100)	171.92*	171.92*	171.92*	171.92	118.67
Index in cents per lb.	4.657*	4.657*	4.657*	4.657	3.215
ARITHMETICAL PRICE COMPOSITES					
Finished Steel, NT	$106.32*	$106.32*	$106.32*	$106.32	$69.36
No. 2 Fdry. Pig Iron, GT	52.54	52.54	52.54	52.54	30.17
Basic Pig Iron, GT	52.16	52.16	52.16	52.16	29.56
Malleable Pig Iron, GT	53.27	53.27	53.27	53.27	30.79
Steelmaking Scrap, GT	43.00	43.00	43.00	44.00	33.75

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 3-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown, Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

* Preliminary.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Feb. 14 1952	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.70	2.60
Bars, H.R., Chicago	3.70	3.70	3.70	3.70	2.60
Bars, H.R., del. Philadelphia	4.223	4.223	4.223	4.18	2.75
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.55	3.20
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.65	2.50
Shapes, Std., Chicago	3.65	3.65	3.65	3.65	2.50
Shapes, del. Philadelphia	3.918	3.918	3.918	3.90	2.64
Plates, Pittsburgh	3.70	3.70	3.70	3.70	2.65
Plates, Chicago	3.70	3.70	3.70	3.70	2.65
Plates, Coatesville, Pa.	4.15	4.15	4.15	4.15	2.80
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.70	2.65
Plates, Claymont, Del.	4.15	4.15	4.15	4.15	2.80
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.60-75	2.50
Sheets, H.R., Chicago	3.60	3.60	3.60	3.60	2.50
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Chicago	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Detroit	4.55	4.55	4.55	4.55	3.35
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.80	3.55
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.75-4.00	2.50
Strip, H.R., Chicago	4.00	4.00	3.50	3.50	2.50
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.65-5.35	3.20
Strip, C.R., Chicago	4.90	4.90	4.90	4.90	3.30
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-5.60	3.35
Wire, Basic, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.85-5.10	3.425
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.50-6.20	4.125
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$8.70	$5.75

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$66.00	$50.00
Wire rods, 5/16" Pitts.	4.10-30	4.10-30	4.10-30	4.10-30	2.675

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$53.00	$31.00
Basic, Valley	52.00	52.00	52.00	52.00	30.00
Basic, del. Phila.	56.61	56.61	56.61	56.39	32.61
No. 2 Fdry., Pitts.	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry., Chicago	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry., Valley	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry., Del. Phila.	57.11	57.11	57.11	56.89	32.61
No. 2 Fdry., Birm.	48.88	48.88	48.88	48.88	28.38
No. 2 Fdry., (Birm.) del. Cin.	55.49	55.49	55.49	55.58	31.75
Malleable, Valley	52.50	52.50	52.50	52.50	30.50
Malleable, Chicago	52.50	52.50	52.50	52.50	30.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	66.00	37.50
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	188.00	140.00*

* F.o.b. Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt., Pitts.	$44.00	$44.00	$44.00	$45.00	$35.00
No. 1 Heavy Melt. e. Pa.	42.50	42.50	42.50	43.50	33.75
No. 1 Heavy Melt, Chicago	42.50	42.50	42.50	43.50	32.50
No. 1 Heavy Melt, Valley	44.00	44.00	44.00	45.00	35.00
No. 1 Heavy Melt, Cleve.	43.00	43.00	43.00	44.00	32.50
No. 1 Heavy Melt, Buffalo	43.00	43.00	43.00	44.00	33.00
Rails, Rerolling, Chicago	52.50	52.50	52.50	52.50	38.50
No. 1 Cast, Pittsburgh	49.00*	49.00*	49.00*	49.00*	42.50

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connsvl.	$14.75	$14.75	$14.75	$14.75	$8.75-9.50
Beehive, Fdry., Connsvl.	17.50	17.50	17.50	17.50	9.75-10.00
Oven, Fdry., Chicago	23.00	23.00	23.00	21.00	15.10

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	24.50	19.50-20.50
Zinc, E. St. Louis	19.50	19.50	19.50	17.50	10.50
Lead, St. Louis	18.80	18.80	18.80	16.80*	12.80-85
Tin, New York	121.50	121.50	103.00	183.00	70.00
Aluminum, del.	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex.	50.00	50.00	50.00	42.00	28.25
Nickel, refinery, duty paid	56.50	56.50	56.50	50.50	35.00

PIG IRON

f.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn, N.Y., del.	....	59.18	59.68	....
Newark, del.	56.87	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
Alabama City, Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S8	48.38	48.88	....	....
Woodward, Ala. W15	48.38	48.88	....	....
Cincinnati, del.	....	55.49	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda, N.Y. W12	52.00	52.50	53.00	....
No. Tonawanda, N.Y. T9	....	52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester, N.Y., del.	54.88	55.38	55.88	....
Syracuse, N.Y., del.	55.91	56.41	56.91	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary, Ind. U5	52.00	....	52.50	....
Indiana Harbor, Ind. I-2	52.00	....	52.50	....
So. Chicago, Ill. W14	52.00	52.50	52.50	....
So. Chicago, Ill., Y1	52.00	52.50	52.50	....
So. Chicago, Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	54.06	54.56	54.56	55.06
Muskegon, Mich., del.	....	58.47	58.47	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron, O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain, O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie, Pa. I-3	52.00	52.50	52.50	53.00
Everett, Mass. E1	....	57.50	58.00	....
Fontana, Calif. K1	58.00	58.50	....	....
Seattle, Tacoma, Wash., del.	....	60.66	....	....
Portland, Oreg., del.	....	60.66	....	....
Los Angeles, San Francisco, del.	60.16	60.66	....	....
Granite City, Ill. G4	53.00	54.40	54.90	....
St. Louis, del. (inc. tax)	54.66	55.16	55.66	....
Ironton, Utah, C11	52.00	52.50	....	....
Geneva, Utah C11	52.00	52.50	....	....
Lonestar, Tex. I-6	48.00	*48.50	48.50	....
Minnequa, Colo. C10	50.00	55.00	55.00	....
Pittsburgh District				
Neville Island, Pa. P6	....	52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	53.80	53.80	54.30
McKeesRocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.07	54.07	54.57
Verona, del.	....	54.57	54.57	55.07
Brackenridge, del.	....	54.82	54.82	55.32
Bessemer, Pa. U5	52.00	....	52.50	53.00
Clairton, Rankin, So. Duquesne, Pa. U5	52.00	....	....	53.00
McKeesport, Pa. N3	52.00	....	....	....
Monessen, Pa. P7	54.00	....	....	....
Sharpsville, Pa. S6	....	....	52.50	53.00
Steelton, Pa. B2	54.00	54.50	55.00	55.50
Swedeland, Pa. A3	56.00	56.50	57.00	57.50
Toledo, O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy, N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield, O., del.	56.65	57.15	57.15	57.65

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

Niagara Falls, N.Y. P15	$88.00
Keokuk, Iowa, Openhearth & Fdry., frt. allowed K2	92.50
Keokuk, Off & Fdry., 12% in pigiets, 16% Si, frt. allowed K2	93.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$66.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton, Pa. B2	60.00
Philadelphia, delivered	63.37
Troy, N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Feb. 14, 1952; cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company. Key on next two pages

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ... $79.00
Munnail,Pa. U5 ... 52.00

INGOTS, Alloy (NT)
Detroit R7 ... $54.00
Fontana,Calif. K1 ... 80.00
Houston,Tex. S5 ... 62.00
Midland,Pa. C18 ... 54.00
Munhall,Pa. U5 ... 54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ... $56.00
Clairton,Pa. U5 ... 56.00
Ensley,Ala. T2 ... 56.00
Fairfield,Ala. T2 ... 56.00
Fontana,Calif. K1 ... 75.00
Gary,Ind. U5 ... 56.00
Johnstown,Pa. B2 ... 56.00
Lackawanna,N.Y. B2 ... 56.00
Munhall,Pa. U5 ... 56.00
So.Chicago,Ill. U5 ... 56.00
So. Duquesne,Pa. U5 ... 56.00
Carbon, Forging (NT)
Bessemer,Pa. U5 ... $66.00
Buffalo R2 ... 66.00
Canton,O. R2 ... 66.00
Clairton,Pa. U5 ... 66.00
Cleveland R2 ... 66.00
Conshohocken,Pa. A3 ... 73.00
Detroit R7 ... 69.00
Ensley,Ala. T2 ... 66.00
Fairfield,Ala. T2 ... 66.00
Fontana,Calif. K1 ... 85.00
Gary,Ind. U5 ... 66.00
Geneva,Utah C11 ... 66.00
Houston,Tex. S5 ... 74.00
Johnstown,Pa. B2 ... 66.00
Lackawanna,N.Y. B2 ... 66.00
LosAngeles B3 ... 85.00
Munhall,Pa. U5 ... 66.00
Seattle B3 ... 85.00
So.Chicago R2,U5,W14 ... 66.00
So. Duquesne,Pa. U5 ... 66.00
So.SanFrancisco B3 ... 85.00
Alloy, Forging (NT)
Bethlehem,Pa. B2 ... $70.00
Buffalo R2 ... 70.00
Canton,O. R2 ... 70.00
Canton,O.(29) T7 ... 66.00
Conshohocken,Pa. A3 ... 77.00
Detroit R7 ... 73.00
Fontana,Calif. K1 ... 89.00
Gary,Ind. U5 ... 70.00
Houston,Tex. S5 ... 78.00
Ind.Harbor,Ind. Y1 ... 70.00
Johnstown,Pa. B2 ... 70.00
Lackawanna,N.Y. B2 ... 70.00
LosAngeles B3 ... 90.00
Massillon,O. R2 ... 70.00
Midland,Pa. C18 ... 70.00
Munhall,Pa. U5 ... 70.00
So.Chicago R2,U5,W14 ... 70.00
So.Duquesne,Pa. U5 ... 70.00
Struthers,O. Y1 ... 70.00
Warren,O. C17 ... 70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ... $82.00
Cleveland R2 ... 82.00
Fontana,Calif. K1 ... 103.00
Gary,Ind. U5 ... 82.00
Massillon,O. R2 ... 82.00
So.Chicago,Ill. R2 ... 82.00
So.Duquesne,Pa. U5 ... 82.00

SHEET BARS (NT)
Fontana,Calif. K1 ... $89.00

SKELP
Aliquippa,Pa. J5 ... $3.45
Munhall,Pa. U5 ... 3.35
Warren,O. R2 ... 3.35
Youngstown R2, U5 ... 3.35

WIRE RODS
Alton,Ill. L1 ... 4.10
AlabamaCity,Ala. R2 ... 4.10
Buffalo W12 ... 4.10
Cleveland A7 ... 4.10
Donora,Pa. A7 ... 4.10
Fairfield,Ala. T2 ... 4.10
Fontana,Calif. K1 ... 4.90
Houston,Tex. S5 ... 4.50
Johnstown,Pa. B2 ... 4.10
Joliet,Ill. A7 ... 4.10
Los Angeles B3 ... 4.90
Minnequa,Colo. C10 ... 4.35
Monessen,Pa. P7 ... 4.30
No.Tonawanda,N.Y. B11 ... 4.10
Pittsburg,Calif. C11 ... 4.75
Portsmouth,O. P12 ... 4.30
Roebling,N.J. R5 ... 4.20
So. Chicago, Ill. R2 ... 4.10
SparrowsPoint,Md. B2 ... 4.20
Sterling,Ill.(1) N15 ... 4.10
Struthers,O. Y1 ... 4.10
Torrance,Calif. C11 ... 4.90
Worcester,Mass. A7 ... 4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ... 4.45
Lackawanna,N.Y. B2 ... 4.45
Munhall,Pa. U5 ... 4.45
So.Chicago,Ill. U5 ... 4.45

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ... 3.60
Aliquippa,Pa. J5 ... 3.65
Bessemer,Ala. T2 ... 3.65
Bethlehem,Pa. B2 ... 3.70
Clairton,Pa. U5 ... 3.65
Fairfield,Ala. T2 ... 3.65
Fontana,Calif. K1 ... 4.25
Gary,Ind. U5 ... 3.65
Geneva,Utah C11 ... 3.65
Houston,Tex. S5 ... 4.05
Ind.Harbor,Ind. I-2 ... 3.65
Johnstown,Pa. B2 ... 3.70
KansasCity,Mo. S5 ... 4.25
Lackawanna,N.Y. B2 ... 3.70
LosAngeles B3 ... 4.25
Minneque,Colo. C10 ... 4.10
Munhall,Pa. U5 ... 3.65
Niles,Calif.(22) P1 ... 4.85
Phoenixville,Pa. P4 ... 5.90
Portland,Oreg. O4 ... 4.50
Seattle B3 ... 4.30
So.Chicago,Ill. U5 W14 ... 3.65
So.SanFrancisco B3 ... 4.20
Torrance,Calif. C11 ... 4.25
Weirton,W.Va. W6 ... 3.90
Alloy Stand. Shapes
Clairton,Pa. U5 ... 4.35
Fontana,Calif. K1 ... 5.55
Munhall,Pa. U5 ... 4.35
So.Chicago,Ill. U5 ... 4.35
H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ... 5.50
Bessemer,Ala. T2 ... 5.50
Bethlehem,Pa.(14) B2 ... 5.50
Clairton,Pa. U5 ... 5.50
Fairfield,Ala. T2 ... 5.50
Fontana,Calif. K1 ... 6.10
Gary,Ind. U5 ... 5.50
Geneva,Utah C11 ... 5.50
Ind. Harbor,Ind. I-2 ... 5.50
Ind.Harbor,Ind. Y-1 ... 6.00
Johnstown,Pa. B2 ... 5.50
Lackawanna,N.Y.(14) B2 ... 5.50
LosAngeles B3 ... 6.05
Munhall,Pa. U5 ... 5.50
Seattle B3 ... 6.10
So.Chicago,Ill. U5 ... 5.50
So.SanFrancisco B3 ... 6.00
Struthers,O. Y1 ... 6.00
Wide Flange
Bethlehem,Pa. B2 ... 3.70
Clairton,Pa. U5 ... 3.65
Fontana,Calif. K1 ... 4.65
Lackawanna,N.Y. B2 ... 3.70
Munhall,Pa. U5 ... 3.65
So.Chicago,Ill. U5 ... 3.65
H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ... 5.50
Lackawanna,N.Y. B2 ... 5.50
Munhall,Pa. U5 ... 5.45
So.Chicago,Ill. U5 ... 5.45
BEARING PILES
Munhall,Pa. U5 ... 3.85
So.Chicago,Ill. U5 ... 3.85
PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 ... 5.65
Bessemer,Ala. T2 ... 5.65
Clairton,Pa. U5 ... 5.65
Cleveland U5, R2 ... 5.65
Conshohocken,Pa. A3 ... 6.25
Fairfield,Ala. T2 ... 5.65
Fontana,Calif.(30) K1 ... 6.25
Gary,Ind. U5 ... 5.65
Geneva,Utah C11 ... 5.65
Ind.Harbor,Ind. I-2 ... 5.65
Ind.Harbor,Ind. Y1 ... 6.15
Johnstown,Pa. B2 ... 5.65
Munhall,Pa. U5 ... 5.65
Pittsburgh J5 ... 5.65
Seattle B3 ... 6.55
Sharon,Pa. S3 ... 5.70
So. Chicago,Ill. U5 ... 5.65
SparrowsPoint,Md. B2 ... 5.65
Warren,O. R2 ... 5.65
Youngstown Y1 ... 6.15
PLATES, Open-Hearth Alloy
Claymont,Del. C22 ... 4.85
Coatesville,Pa. L7 ... 5.25
Conshohocken,Pa. A3 ... 5.05
Fontana,Calif. K1 ... 5.70
Gary,Ind. U5 ... 4.75
Johnstown,Pa. B2 ... 4.75
Munhall,Pa. U5 ... 4.75
Sharon,Pa. S3 ... 5.20
So. Chicago,Ill. U5 ... 4.75
SparrowsPoint,Md. B2 ... 4.75
FLOOR PLATES
Cleveland J5 ... 4.75
Conshohocken,Pa. A3 ... 4.75
Ind.Harbor,Ind. I-2 ... 4.75
Munhall,Pa. U5 ... 4.75
So.Chicago,Ill. U5 ... 4.75
PLATES, Ingot Iron
Ashland,c.l.(15) A10 ... 3.95
Ashland,l.c.l.(15) A10 ... 4.45
Cleveland,c.l. R2 ... 4.30
Warren,O.c.l. R2 ... 4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ... 3.60
Aliquippa,Pa. J5 ... 3.60
Ashland,Ky.(15) A10 ... 3.70
Bessemer,Ala. T2 ... 3.60
Clairton,Pa. U5 ... 3.60
Claymont,Del. C22 ... 4.15
Cleveland J5, R2 ... 3.70
Coatesville,Pa. L7 ... 4.15
Conshohocken,Pa. A3 ... 4.10
Fairfield,Ala. T2 ... 3.60
Fontana,Calif.(30) K1 ... 4.30
Gary,Ind. U5 ... 3.60
GraniteCity,Ill. G4 ... 4.40
Geneva,Utah C11 ... 3.60
Harrisburg,Pa. C5 ... 6.30
Houston,Tex. S5 ... 4.10
Ind. Harbor,Ind. I-2, Y1 ... 3.70
Johnstown,Pa. B2 ... 3.70
Lackawanna,N.Y. B2 ... 3.60
Minnequa,Colo. C10 ... 4.50
Munhall,Pa. U5 ... 3.70
Pittsburgh J5 ... 3.70
Seattle B3 ... 4.60
Sharon,Pa. S3 ... 3.95
So.Chicago,Ill. U5, W14 ... 3.70
SparrowsPoint,Md. B2 ... 3.70
Steubenville,O. W10 ... 3.80
Weirton,W.Va. W6 ... 4.00
Youngstown R2, U5, Y1 ... 3.70
PLATES, Carbon A.R.
Fontana,Calif. K1 ... 5.40
Geneva,Utah C11 ... 4.85
PLATES, Wrought Iron
Economy,Pa. B14 ... 8.60
BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ... 3.60
Aliquippa,Pa. J5 ... 3.70
Alton,Ill. L1 ... 4.15
Atlanta,Ga. A11 ... 4.25
Bessemer,Ala. T2 ... 3.60
Buffalo R2 ... 3.70
Canton,O. R2 ... 3.70
Clairton,Pa. U5 ... 3.70
Cleveland R2 ... 3.70
Detroit R7 ... 3.85
Emeryville,Calif. J7 ... 4.45
Fairfield,Ala. T2 ... 3.60
Fontana,Calif. K1 ... 4.40
Gary,Ind. U5 ... 3.70
Houston,Tex. S5 ... 4.10
Ind.Harbor,Ind. I-2, Y1 ... 3.70
Johnstown,Pa. B2 ... 3.70
Kansas City, Mo. S5 ... 4.30
Lackawanna,N.Y. B2 ... 3.70
LosAngeles B3 ... 4.40
Milton,Pa. B6 ... 4.55
Minnequa,Colo. C10 ... 4.15
Niles,Calif. P1 ... 5.00
N.Tonawanda,N.Y. B11 ... 3.60
Pittsburg,Calif. C11 ... 4.40
Pittsburgh J5 ... 3.60
Portland,Oreg. O4 ... 4.60
Seattle B3, N14 ... 4.45
Struthers,O. Y1 ... 3.70
Torrance,Calif. C11 ... 4.40
Weirton,W.Va. W6 ... 3.85
So.Chicago R2, U5, W14 ... 3.70
So.Duquesne,Pa. U5 ... 3.70
So.SanFran.,Cal. B3 ... 4.45
Youngstown R2, U5 ... 3.70
BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ... 3.60
Atlanta A11 ... 4.25
Johnstown,Pa. B2 ... 3.70
Lackawanna,N.Y. B2 ... 3.70
Niles,Calif. P1 ... 5.05
Portland,Oreg. O4 ... 4.65
SanFrancisco S7 ... 4.85
BAR SIZE ANGLES, H.R. CARBON
Bethlehem,Pa. B2 ... 3.90
BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ... 4.30
Buffalo R2 ... 4.30
Canton,O. R2 ... 4.30
Canton,O.(29) T7 ... 3.95
Clairton,Pa. U5 ... 4.30
Detroit, R7 ... 4.45
Ecorse,Mich. G5 ... 4.65
Fontana,Calif. K1 ... 5.35
Gary,Ind. U5 ... 4.30
Houston,Tex. S5 ... 4.90
Ind.Harbor,Ind. I-2, Y1 ... 4.30
Johnstown,Pa. B2 ... 4.30
KansasCity,Mo. S5 ... 4.90
Lackawanna,N.Y. B2 ... 4.30
LosAngeles B3 ... 5.35
Massillon,O. R2 ... 4.30
Midland,Pa. C18 ... 4.30
So.Chicago R2, U5, W14 ... 4.30
So.Duquesne,Pa. U5 ... 4.30
Struthers,O. Y1 ... 4.30
Warren,O. C17 ... 4.30
Youngstown U5 ... 4.30
BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ... 4.55
Gary,Ind. U5 ... 4.55
Youngstown U5 ... 4.55

BARS & SMALL SHAPES, H.R.
High-Strength Low-Alloy
Aliquippa,Pa. J5 ... 5.50
Bessemer,Ala. T2 ... 5.50
Bethlehem,Pa. B2 ... 5.50
Clairton,Pa. U5 ... 5.50
Cleveland R2 ... 5.50
Fairfield,Ala. T2 ... 5.50
Fontana,Calif. K1 ... 6.60
Gary,Ind. U5 ... 5.50
Houston,Tex. S5 ... 6.10
Ind.Harbor,Ind. I-2 ... 5.50
IndianaHarbor,Ind. Y1 ... 6.05
Johnstown,Pa. B2 ... 5.50
Lackawanna,N.Y. B2 ... 5.50
Pittsburgh J5 ... 5.55
Youngstown U5 ... 5.55
BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ... 4.55
BeaverFalls,Pa. M12 R2 ... 4.55
Buffalo B5 ... 4.60
Camden,N.J. P13 ... 5.00
Carnegie,Pa. C12 ... 4.55
Chicago W18 ... 4.55
Cleveland A7, C20 ... 4.55
Detroit P17 ... 4.70
Donora,Pa. A7 ... 4.55
Elyria,O. W8 ... 4.55
FranklinPark,Ill. N5 ... 4.55
Gary,Ind. R2 ... 4.55
GreenBay, Wis. F7 ... 4.55
Hammond,Ind. L2, M13 ... 4.55
Hartford,Conn. R2 ... 5.10
Harvey,Ill. B5 ... 4.55
LosAngeles R2 ... 6.00
Mansfield,Mass. B5 ... 5.10
Massillon,O. R2, R8 ... 4.55
Monaca,Pa. S17 ... 4.55
Newark,N.J. W18 ... 5.00
Plymouth,Mich. P5 ... 4.80
Pittsburgh J5 ... 4.55
Putnam,Conn. W18 ... 5.10
Readville,Mass. C14 ... 5.10
St.Louis,Mo. M5 ... 4.95
So.Chicago,Ill. W14 ... 4.55
SpringCity,Pa. (5) K3, ... 5.00
Struthers,O. Y1 ... 4.55
Waukegan,Ill. A7 ... 4.55
Youngstown F3, Y1 ... 4.55
BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ... 5.40
BeaverFalls,Pa. M12 ... 5.40
Bethlehem,Pa. B2 ... 5.40
Buffalo B5 ... 5.40
Camden,N.J. P13 ... 5.80
Canton,O. R2 ... 5.40
Canton,O.(29) T7 ... 4.90
Carnegie,Pa. C12 ... 5.40
Chicago W18 ... 5.40
Cleveland A7 ... 5.45
Cleveland C20 ... 5.40
Detroit P17 ... 5.55
Donora,Pa. A7 ... 5.45
Elyria,O. W8 ... 5.40
Gary,Ind. R2 ... 5.40
Hammond,Ind. L2, M13 ... 5.40
Hartford,Conn. R2 ... 5.85
Harvey,Ill. B5 ... 5.40
Lackawanna,N.Y. B2 ... 5.40
Mansfield,Mass. B5 ... 5.85
Massillon,O. R2, R8 ... 5.40
Midland,Pa. C18 ... 5.40
Monaca,Pa. S17 ... 5.40
Newark,N.J. W18 ... 5.75
Plymouth,Mich. P5 ... 5.60
So.Chicago,Ill. R2, W14 ... 5.40
Struthers,O. Y1 ... 5.40
Warren,O. C17 ... 5.40
Waukegan,Ill. A7 ... 5.45
Worcester,Mass. A7 ... 5.75
Youngstown F3, Y1 ... 5.40
RAIL STEEL BARS
ChicagoHts.(3,4) C2 ... 4.25
ChicagoHts.(3,4) I-2 ... 4.75
Franklin,Pa.(3,4) P5 ... 4.75
FortWorth,Tex.(26) T4 ... 4.85
Huntngtn,W.Va.(3) W7 ... 5.50
Marion,O.(3) P11 ... 4.75
Moline,Ill.(3) R2 ... 3.80
Pittsburg,Calif.(3) B12 ... 4.75
Williamsport(3) S19 ... 5.00
Williamsport(4) S19 ... 5.10
BARS, Wrought Iron
Dover,N.J.(Staybolt) U1 ... 15.00
Dover,c.l.(Eng.Bolt) U1 ... 13.50
Dover,c.l.(Wrgh.Iron) U1 ... 12.25
Economy,Pa.(S.R.) B14 ... 9.60
Economy,Pa.(D.R.) B14 ... 11.90
Economy,(Staybolt) B14 ... 12.20
McK.Rks.(Staybolt) L5 ... 14.50
McK.Rks.(S.R.) L5 ... 9.60
McK.Rks.(D.R.) L5 ... 13.00
BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ... 3.70
Atlanta A11 ... 4.25
Buffalo R2 ... 3.70
Cleveland R2 ... 3.70
Emeryville,Calif. J7 ... 4.45
Fairfield,Ala. T2 ... 3.70
Fontana,Calif. K1 ... 4.40
Gary,Ind. U5 ... 3.70
Houston,Tex. S5 ... 4.10
Ind.Harbor,Ind. I-2, Y1 ... 3.70
Johnstown,Pa. B2 ... 3.70
KansasCity,Mo. S5 ... 4.30
Lackawanna,N.Y. B2 ... 3.70
LosAngeles B3 ... 4.40
Milton,Pa. B6 ... 4.55
Minnequa,Colo. C10 ... 4.10
Pittsburgh J5 ... 3.70
Portland,Oreg. O4 ... 4.60
SandSprings,Okla. S5 ... 4.30
Seattle B3, N14 ... 4.45
So. Chicago,Ill. R2 ... 3.70
So.Duquesne,Pa. U5 ... 3.70
So.SanFrancisco B3 ... 4.45
SparrowsPoint,Md. B2 ... 3.70
Struthers,O. Y1 ... 3.70
Torrance,Calif. C11 ... 4.40
Youngstown R2, U5 ... 3.70
BARS, Reinforcing
(Fabricated to Consumers)
Huntington,W.Va. W7 ... 5.50
Johnstown, ¼-1" B2 ... 4.75
Los Angeles B3 ... 5.45
Marion,O. P11 ... 5.00
Seattle B3, N14 ... 5.55
So.SanFrancisco B3 ... 5.45
SparrowsPt., ¼-1" B2 ... 4.75
Williamsport,Pa. S19 ... 5.10
SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ... 3.60
Ashland,Ky.(8) A10 ... 3.60
Butler,Pa. A10 ... 3.60
Cleveland J5, R2 ... 3.60
Conshohocken,Pa. A3 ... 4.00
Detroit M1 ... 4.40
Ecorse,Mich. (9) G5 ... 3.90
Fairfield,Ala. T2 ... 3.60
Fontana,Calif. K1 ... 4.55
Gary,Ind. U5 ... 3.60
Geneva,Utah C11 ... 3.70
GraniteCity, Ill. G4 ... 4.30
Ind.Harbor,Ind. I-2, Y1 ... 3.60
Irvin,Pa. U5 ... 3.60
Lackawanna,N.Y. B2 ... 3.60
Munhall,Pa. U5 ... 3.60
Niles,O. N12 ... 5.25
Pittsburg,Calif. C11 ... 4.30
Pittsburgh J5 ... 3.60
Sharon,Pa. S3 ... 4.00
So.Chicago,Ill. W14 ... 3.60
SparrowsPoint,Md. B2 ... 3.60
Steubenville,O. W10 ... 3.60
Torrance,Calif. C11 ... 4.30
Warren,O. R2 ... 3.60
Weirton,W.Va. W6 ... 3.60
WestLeechburg,Pa. A4 ... 3.75
Youngstown U5, Y1 ... 3.60
SHEETS, H.R., (19 gage)
AlabamaCity,Ala. R2 ... 4.75
Dover,O. R1 ... 5.65
Ind.Harbor,Ind. I-2 ... 4.60
Mansfield,O. E6 ... 5.65
Niles,O. N12 ... 5.75
Torrance,Calif. C11 ... 5.40
SHEETS, H.R., (14-ga., heavier)
High-Strength Low-Alloy
Cleveland J5, R2 ... 5.40
Conshohocken,Pa. A3 ... 5.65
Ecorse,Mich. G5 ... 5.95
Fairfield,Ala. T2 ... 5.40
Fontana,Calif. K1 ... 6.35
Gary,Ind. U5 ... 5.40
Ind.Harbor,Ind. I-2 ... 5.40
IndianaHarbor,Ind. Y1 ... 5.90
Irvin,Pa. U5 ... 5.40
Lackawanna(35) B2 ... 5.40
Pittsburgh J5 ... 5.40
Sharon,Pa. S3 ... 5.40
So.Chicago,Ill. U5 ... 5.40
SparrowsPoint(36) B2 ... 5.40
Warren,O. R2 ... 5.40
Weirton,W.Va. W6 ... 5.75
Youngstown U5 ... 5.40
Youngstown,(37) Y1 ... 5.90
SHEETS, Cold-Rolled
High-Strength Low-Alloy
Cleveland J5, R2 ... 6.55
Ecorse,Mich. G5 ... 7.10
Fontana,Calif. K1 ... 7.50
Gary,Ind. U5 ... 6.55
IndianaHarbor,Ind. Y1 ... 7.05
IndianaHarbor,Ind. I-2, ... 6.55
Irvin,Pa. U5 ... 6.55
Lackawanna(37) B2 ... 6.55
Pittsburgh J5 ... 6.55
SparrowsPoint(38) B2 ... 6.55
Warren,O. R2 ... 6.55
Weirton,W.Va. W6 ... 6.90
Youngstown Y1 ... 7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.50
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.65
Ind Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.50
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind Harbor,Ind. I-2	5.10

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10

BLUED Stock, 29 ga

Yorkville,O. W10	6.80
Follansbee,W.Va.(23)F4	6.85

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GranniteCity,Ill. G4	7.35	7.60	8.00
Ind Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R (22 Ga.) COILS (Cut Lengths 1/2c lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va.(cut-lengths)			7.25	8.50	9.30
Brackenridge,Pa. A4			7.25	9.00	9.80
GranniteCity,Ill.G4 (cut lengths)			7.95	9.20	
Ind Harbor,Ind. I-2	6.95	7.25	(34)		
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)		6.75	7.25		
Vandergrift,Pa. U5		7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10		7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths 1/2c lower) Transformer Grade

	72	65	58	52
BeechBottom,W.Va.(cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35			
Vandergrift,Pa. U5	10.35	10.90	11.69	12.40
Warren,O. R2	10.35			
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	I-100	I-90	I-80	I-73
Butler,Pa. A10 (C.R.)			14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

SHEETS, Culvert, No. 16 Pure Iron

	Cu	Cu Alloy	Cu Fe
Ashland,Ky. A10	5.60		
Canton,O. R2	5.65	6.10	
Fairfield,Ala. T2	5.60	5.85	
Gary,Ind. U5	5.60	5.85	
IndianaHarbor I-2	5.60	5.85	
Irvin,Pa. U5	5.60	5.85	5.85
Kokomo,Ind. C16	6.25		
MartinsFy.O. W10	5.80	5.85	
Pittsburg,Cal. C11	6.35		
SparrowsPt. B2	5.60		
Torrance,Cal. C11	6.35		

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.85
Cleveland R2	4.20
Ind Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky.(8), A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TINPLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.50

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	5.50
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.50
Fontana,Calif. K1	6.20
Gary Ind. U5	5.50
Ind.Harb.,Ind. I-2	5.50
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.50

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill. L1	3.95
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	3.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32) B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.35
Minnequa,Colo. C10	4.55
NewBritain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7		6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1			7.70	9.65	
Carnegie,Pa. S18		6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65		
Detroit D2	5.60	6.65	7.25		
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18			7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35		
NewYork W3		7.10	7.70	9.65	11.95
Pawtucket,R.I. NS:					
Cleve.orPitts Base		6.80	7.40	9.35	11.65
Worcester,Mass. Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5		7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8		6.80	7.40	9.35	11.65

Spring Steel (Tempered)

Trenton,N.J. R5		10.30	12.50	15.35
Harrison,N.J. C18		10.30	12.50	15.35
NewYork W3		10.30	12.50	15.35

Midland,Pa. C18 5.85
NewBritn,Conn.(10) S15 5.45
Sharon,Pa. S3 5.85
Youngstown U5 5.50

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgeprt,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
FranklinPark,Ill.(40) T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle,Pa.(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) N8	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
SharonPa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Diston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Fitch Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div. Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Cold-Rolled Alloy Steel

Bridgeport,Conn.(10)	8I5 10.75
Carnegie,Pa.	8I8 ....10.60
Cleveland A7	....10.00
Dover,O. G6	....10.50
Fontana,Calif. K1	....11.65
Harrison,N.J. C18	....10.60
Midland,Pa. C18	....10.60
NewBritn,Conn.(10)	8I5 10.75
Pawtucket,R.I.(11)	N8 10.75
Pawtucket,R.I.(12)	N8 11.05
Sharon,Pa. S3	....10.60
Worcester,Mass. A7	....10.30
Youngstown C8	....10.60

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	....3.75
Warren,O. R2	....4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	....5.25

TIGHT COOPERAGE HOOP

Atlanta A11	....4.05
Riverdale,Ill. A1	....3.90
Sharon,Pa. S3	....4.15
Youngstown U5	....3.75

WIRE, Tire Bead

Bartonville,Ill.(1) K4	...10.90
Monessen,Pa. P16	....11.40
Roebling,N.J. R5	....11.55

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity R2,	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19)K4	5.70	6.15
Buffalo W12	4.85	...
Cleveland A7	5.70	6.15
Crawfordsville M8	5.95	6.40
Donora,Pa. A7	5.70	6.15
Duluth,Minn. A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasCy,Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	...
Minnequa C10	5.95	4.45
Monessen P7	5.95	6.40
Palmer W12	5.15	...
Pitts. Calif. C11	6.65	6.80
Prtsmth.(18)P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.65	7.10
SparrowsPt, B2	5.80	6.25
Sterling,Ill.(1)N15	5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	...
Worcester A7	6.00	6.45

ROPE WIRE

	(A)	(B)
Alton,Ill. L1	8.65	8.90
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen Pa. P7	8.80	9.05
Palmer,Mass.W12	8.85	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.85	9.10
SparrowsPt, B2.,	8.65	8.90
Struthers,O. Y1.,	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	....4.85
Aliquippa,Pa. J5	....4.85
Atlanta A11	....5.10
Alton,Ill. L1	....5.05
Bartonville,Ill.(1) K4	....4.85
Buffalo W12	....4.85
Cleveland A7	....5.10
Cleveland A7, C20	....4.85
Crawfordsville,Ind. M8	....5.10
Donora,Pa. A7	....4.85
Duluth,Minn. A7	....4.85
Fairfield,Ala. T2	....4.85
Fostoria,O.(24) S1	....5.35
Houston S5	....5.25
Johnstown,Pa. B2	....4.85
Joliet,Ill. A7	....4.85
KansasCity,Mo. S5	....5.45
Kokomo,Ind. C16	....4.95
LosAngeles B3	....5.80
Minnequa,Colo. C10	....5.10
Monessen,Pa. P7	....5.10
Newark, 6-8 ga. I-1	....5.50
No.Tonawanda B11	....4.85
Palmer,Mass. W12	....5.15
Pittsburg,Calif. C11	....5.80
Portsmouth,O. P12	....5.25
Rankin,Pa. A7	....4.85
So.Chicago,Ill. R2	....4.85
So.SanFrancisco C10	....5.80
SparrowsPoint,Md. B2	....4.95
Sterling,Ill.(1) N15	....4.85
Struthers,O. Y1	....4.85
Torrance,Calif. C11	....5.80
Waukegan,Ill. A7	....4.85
Worcester,Mass. A7, T6	5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	....6.20
Buffalo W12	....6.35
Cleveland A7	....5.85
Crawfordsville,Ind. M8	....6.20
Detroit D2	....6.20
Dover,O. G6	....6.20
Fostoria,O. S1	....6.00
Kokomo,Ind. C16	....5.70
FranklinPark,Ill. T6	....6.20
Massillon,O. R8	....5.85
Monessen,Pa. P16	....5.85
Monessen,Pa. P7	....6.10
NewHaven,Conn. D2	....6.50
Pawtucket,R.I.(12)	N8...6.85
Trenton,N.J. R5	....6.15
Worcester,Mass. A7	....6.15
Worcester,Mass. T6	....6.50
Worcester,Mass. W12	....6.45

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	....8.50
Monessen,Pa. P16	....8.50
Roebling,N.J. R5	....8.80
SparrowsPoint,Md. B2	....8.60
Johnstown,Pa. B2	....8.50

WIRE (16 gage)

	An'ld Stone	Galv. Stone
Aliquippa J5	10.15	12.15
Bartonville(1)K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsville M8	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass.W12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt, B2	10.35	12.25
Waukegan A7	10.25	12.15

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	....6.25
Alton,Ill. L1	....6.45
Bartonville,Ill.(1) K4	....6.25
Buffalo W12	....6.25
Cleveland A7	....6.25
Donora,Pa. A7	....6.25
Duluth,Minn. A7	....6.25
Fostoria,O. S1	....6.25
Johnstown,Pa. B2	....6.25
LosAngeles B3	....7.20
Milbury,Mass.(12) N6	....8.05
Monessen,Pa. P7, P16	....6.25
Palmer,Mass. W12	....6.55
Pittsburg,Calif. C11	....7.20
Roebling,N.J. R5	....6.55
Portsmouth,O. P12	....6.25
So.Chicago,Ill. R2	....6.25
So.SanFrancisco C10	....7.20
SparrowsPoint,Md. B2	....6.35
Struthers,O. Y1	....6.25
Trenton,N.J. A7	....6.55
Waukegan,Ill. A7	....6.25
Worcester,Mass. A7	....6.55
Worcester A7, T6, W12	6.55
Worcester,Mass. J4	....6.75

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1) K4	...8.90
Buffalo W12	....8.90
Chicago W13	....8.90
Cleveland A7	....8.90
Crawfordsville,Ind. M8	..8.95
Fostoria,O. S1	....8.90
Johnstown,Pa. B2	....8.90
Kokomo,Ind. C16	....8.90
Monessen,Pa. P16	....8.90
Palmer,Mass. W12	....9.20
Portsmouth,O. P12	....8.90
Roebling,N.J. R5	....9.20
Waukegan,Ill. A7	....8.90
Worcester,Mass. A7, T6	9.20

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	...137
Aliquippa,Pa. J5	141
Atlanta A11	144
Bartonville,Ill.(19) K4	144
Crawfordsville,Ind. M8	146
Donora,Pa. A7	141
Duluth,Minn. A7	141
Fairfield,Ala. T2	141
Houston,Tex. S5	149
Johnstown,Pa. B2	141
Joliet,Ill. A7	141
KansasCity,Mo. S5	153
Kokomo,Ind. C16	143
Minnequa,Colo. C10	147
Monessen,Pa. P7	146
Pittsburg,Calif. C11	161
Portsmouth,O.(18) P12	...148
Rankin,Pa. A7	141
So.Chicago,Ill. R2	137
So.SanFran.,Calif. C10	...161
SparrowsPoint,Md. B2	...143
Sterling,Ill.(1) N15	141

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	...123
Atlanta A11	128
Bartonville,Ill.(19) K4	...123
Crawfordsville,Ind. M8	...132
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	125
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	...147
SparrowsPoint,Md. B2	...125
Sterling,Ill.(1) N15	123

WIRE,Upholstery Spring

Aliquippa,Pa. J5	....5.90
Alton,Ill. L1	....6.10
Buffalo W12	....5.90
Cleveland A7	....5.90
Donora,Pa. A7	....5.90
Duluth,Minn. A7	....5.90
Johnstown,Pa. B2	....5.90
LosAngeles B3	....6.55
Monessen,Pa. P7, P16	...5.90
New Haven,Conn. A7	....6.20
Palmer,Mass. W12	....6.20
Pittsburg,Calif. C11	....6.85
Portsmouth,O. P12	....5.90
Roebling,N.J. R5	....6.20
So.Chicago,Ill. R2	....5.90
So.SanFrancisco C10	...6.85
SparrowsPoint,Md. B2	...6.00
Torrance,Calif. C11	....6.85
Trenton,N.J. A7	....6.20
Waukegan,Ill. A7	....5.90
Worcester,Mass. A7	....6.20

WOVEN FENCE, 9-1½½ Ga. Col.

AlabamaCity,Ala. R2	...127
Ala.City,Ala.,17-18ga.R2	214
Aliquippa,Pa.9-14½ga.J5	131
Atlanta A11	134
Bartonville,Ill.(19) K4	...131
Crawfordsville,Ind M8	...133
Donora,Pa. A7	131
Duluth,Minn. A7	131
Fairfield,Ala. T2	131
Houston,Tex. S5	139
Johnstown,Pa. B2	131
Johnstown,17ga.,6" B2	...206
Johnstown,17ga.4" B2	...206
Joliet,Ill. A7	131
KansasCity,Mo. S5	143
Kokomo,Ind. C16	133
Minnequa,Colo. C10	139
Monessen,Pa. P7	136
Pittsburg,Calif. C11	154
Portsmouth,O.(18) P12	...134
Rankin,Pa. A7	131
So.Chicago,Ill. R2	127
Sterling,Ill. (1) N15	131

FENCE POSTS

ChicagoHts., Ill. C2	140
Duluth,Minn. A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago,Ill. R2	140
Tonawanda,N.Y. B12	140
Williamsport,Pa. S19	150

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	....9.85
Lebanon,Pa.(31) B2	....9.85
Minnequa,Colo. C10	....9.85
Pittsburgh O3, P14	....9.85
Seattle B3	....10.35

NAILS & STAPLES, Stock

To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	...118
Aliquippa,Pa.(13) J5	...118
Atlanta A11	121
Bartonville,Ill.(19) K4	...118
Chicago,Ill. W13	118
Cleveland A9	120
Crawfordsville,Ind. M8	...122
Donora,Pa. A7	118
Duluth,Minn. A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	134
Pittsbug,Calif. C11	137
Portsmouth,O. P12	134
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	...130
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	134

NAILS, Cut (100 lb keg)

To dealers (33)	Col.
Conshohocken,Pa. A3	$7.35
Wheeling,W.Va. 10	....7.35

TIE PLATES

Fairfield,Ala. T2	....4.80
Gary,Ind. U5	....4.80
Ind.Harbor,Ind. I-2	...4.50
Lackawanna,N.Y. B2	...4.50
Minnequa,Colo. C10	...4.80
Pittsburg,Calif. C11	...4.65
Seattle B3	....4.80
Steelton,Pa. B2	....4.50
Torrance,Calif. C11	...4.65

JOINT BARS

Bassemer,Pa. U5	....4.70
Fairfield,Ala. T2	....4.70
Ind.Harbor,Ind. I-2	...4.70
Joliet,Ill. U5	....4.70
Lackawanna,N.Y. B2	...4.70
Minnequa,Colo. C10	...4.70
Steelton,Pa. B2	....4.70

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	....6.40
Lebanon,Pa. B2	....6.15
Minnequa,Colo. C10	....6.15
Pittsburgh J5	....6.15
Seattle B3	....6.65
So.Chicago,Ill. R2	....6.15
Struthers,O. Y1	....6.15
Youngstown R2	....6.15

RAILS

	Std. No. 1	Std. No. 2	All No. 2	Std. Toe Rails 60 lb. Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50	...	4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	...(16)14.00	
Lackawanna,N.Y. B2	3.60	3.50	...	4.00
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19	...	...	...	4.75

AXLES

Ind.Harbor,Ind. S13	....5.60
Johnstown,Pa. B2	....5.60

TOOL STEEL

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.325
Oil Hardening	0.350
5% Cr Hot Work	0.350
Hi-Carbon-Cr	0.635

Grade by Analysis

W	Cr	V	Co	
18	4	1	....	1.500
18	4	2	....	1.650
20.25	4.25	1.6	12.25	3.535-3.675
19	4	2	7	2.460
18.25	4.25	1	4.75	2.125
18	4	2	9	4.445-2.45
13.5	4	3	....	1.6025

W	Cr	V	Mo	
6.4	4.5	1.9	5	0.96-0.960
6	4	3	6	1.190
1.5	4	1	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Footnotes:
(1) Chicago base.
(2) Angles, flats, bands
(3) Merchant.
(4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower
(8) 16 gage and heavier
(9) 6 in. and narrower
(10) Pittsburgh base.
(11) Cleveland & Pitts. base
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier
(14) Also wide flange beams
(15) ¼" and thinner.
(16) 40 lb and under
(17) Flats only
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn. base
(22) Del San Francisco Bay area
(23) 29 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths to 18 fabricators to consumers, 5.60c
(27) Bar mill rises.
(28) Reinforcing
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 20c
(34) 7.25c for cut lengths.
(35) 7.35" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.033"; 0.025" and heavier 0.25c higher.

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb. Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Div.
N14 Northwest Steel Roll Mills
N15 Northwestern S.&W. Co.
N16 New Delledone Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,Eaton Mfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West Auto Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 YoungstownSheet&Tube

New Problems Confront Industry in the Change-Over from Commercial to Defense Production

Let's face it . . . the billions of dollars going into defense production are causing a lot of shop headaches. Orders are coming through for new parts and assemblies. Production men are up against the problem of using grades of steel with which they may be unfamiliar. The front office is calling for tighter schedules, better cost control, more output. And to top it all, NPA priorities are still other headaches. These days, a fellow *really* needs a friend!

A Nearby Source for Help

What you want is a *dependable* source of help on a hundred-and-one problems involving the selection and complete application of specialty steels. For example, let's say you're faced with changing from an 18-8 stainless to a straight chrome grade and the switch may involve new techniques in welding, drawing, forming, etc. Don't let it "get you down". Often, your Carpenter representative can give you the data you need from past experience. And if he can't, he always has the facilities and know-how of specialists in the Reading Mill to draw upon.

Or, perhaps you're up against the problem of tooling up for a defense job that calls for die performance far beyond your normal requirements. If so, your Carpenter representative can give you interesting facts on a simplified method of steel selection that will help you arrive at the steel best suited to your needs.

One call brings all this extra service

So the next time you feel like "throwing in the sponge" call your Carpenter Mill-Branch Warehouse. Here is a service backed by a pioneering Mill Research Laboratory, production men, engineers, steel specialists . . . all willing to pitch in on your steel problems. Best of all, we *want* to help you. And today, that's important. A call to your Carpenter Mill-Branch Warehouse sets this *extra service* in motion. THE CARPENTER STEEL COMPANY, 139 W. Bern Street, Reading, Pa.

A shift to defense production *in one plant called for many new dies to make hundreds of new parts. A Carpenter Mill-Branch representative helped to install a "tooling program" that paid off in better tools and dies, fewer headaches all along the line.*

Carpenter

DON'T WAIT... COOPERATE!

Mill-Branch Warehouse Service

SPECIALTY TOOL • ALLOY and STAINLESS STEELS

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	...	+0.5	+2.5	...
¼	6.0	0.42	28.5	26.5	...	+3.5	+5.5	...
⅜	6.0	0.57	23.5	21.5	...	+10.0	+12.0	...
½	8.5	0.85	36.0	34.0	35.0	12.0	10.0	11.0
¾	11.5	1.18	39.0	37.0	38.0	16.0	14.0	15.0
1	17.0	1.68	41.5	39.5	40.5	19.5	17.5	18.5
1¼	23.0	2.28	42.0	40.0	41.0	20.5	18.5	19.5
1½	27.5	2.78	42.5	40.5	41.5	21.5	19.5	20.5
2	37	3.68	43.0	41.0	42.0	22.0	20.0	21.0
2½	58.5	5.82	43.5	41.5	42.5	23.0	21.0	22.0
3	76.5	7.62	43.5	41.5	42.5	23.0	21.0	22.0

Column A: Etna, Pa. N2 and 36½% on 3½", 4"; Butler, Pa. ½-⅜", F6; Benwood, W. Va., 3½ points lower on ½", 1½ points lower on ¾", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ¼", 2 points lower on ¾" and ⅜". Wheatland, Pa. W9, 2 points lower on ½", ¾", ⅜"; Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼% on 3½" and 4"; Youngstown Y1, Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., Y1, Alton, Ill. (Gary base) 2 points lower discount L1.

Column D: Butler, Pa. F6, ½-⅜": Benwood, W. Va. W10, except plus 4% on ¼", plus 6% on ⅜", plus 13% on ½" and 15.5% on 3½", 4"; Sharon, Pa. M6, plus 2.5 on ½", 1 point lower on ¾", ⅜", 1½ points lower on 1" and 1¼", 2 points lower on 1¼", 2" 2½" and 3". Wheatland, Pa. W9, add 2 points on ¼", ½", ⅜", 1 point lower on ¾", 2 points lower on 1", 1¼", 2", 1½ points lower on 1¼", 2½", 3". Etna, Pa. N2 and 15.5% on 3½", 4". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 15½% on 3½" and 4"; Youngstown Y1, Aliquippa Pa. J5 quotes 1 point lower on ¾", 2 points lower on 1" 1½", 2", 1¼ points lower on 1¼", 2½" and 3".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv D
2	37.0c	3.68	29.5	8.0	29.5	8.0
2½	58.5	5.82	32.5	11.5	32.5	11.5
3	76.5	7.62	32.5	11.5	32.5	11.5
3½	92.0	9.20	34.5	13.5	34.5	13.5
4	$1.09	10.89	34.5	13.5	34.5	13.5
5	1.48	14.31	37.0	16.0	37.0	16.0
6	1.92	19.18	37.0	16.0	37.0	16.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3, Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill, minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2¼	12	26.92	32.97	26.98	31.76
2½	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Thickness	Plates 10%	Plates 20%	Strip Cold-Rolled Carbon Base 10%	Strip Cold-Rolled Carbon Base Both Sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Cu Base Both Sides
302	....	....	....	....	19.75	26.24-27.50	77.00
304	25.00	29.50	....	....	24.50	27.50-27.77	77.00
309	30.50	35.00	....	....	....	....	....
310	36.50	41.00	....	....	....	....	144.00
316	29.50	34.00	....	....	26.00	33.92-36.50	....
317	34.50	39.00	....	....	....	....	....
318	33.50	38.00	....	....	....	....	....
321	26.50	31.00-32.00	....	....	23.00	33.00	111.00
347	27.50	32.00	....	....	24.00	33.50-33.83	130.00
400	21.25	27.75	....	....	....	....	....
410	20.75	27.25	....	....	....	....	....
Nickel	33.55	45.15	41.00	54.00	....	....	....
Inconel	41.23	54.18	....	....	....	....	165.00
Monel	34.93	46.28	....	....	....	....	....
Copper*	....	....	23.70†	29.65‡	....	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S1s. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:

½-in. & smaller diam.	10
⅝-in. & ¾-in.	18.5
⅞-in. and larger	17.5
Longer than 6 in.:	
All diams.	14
Lag bolts, all diams.	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up Bolts	31

NUTS

	Reg. Hvy.
H.P. & C.P. Square:	
½-in. & smaller	15
⅝-in. & ¾-in.	12 6.5
⅞-in.-1⅛-in.	9 1
1⅛-in. & larger	7.5 1
H.P. Hex.:	
½-in. & smaller	26 22
⅝-in. & ¾-in.	16.5 6.5
⅞-in.-1⅛-in.	12 2
1⅛-in. & larger	8.5 2
C.P. Hex.:	
½-in. & smaller	26 22
⅝-in. & ¾-in.	23 17.5
⅞-in. & 1⅛-in.	19.5 12
1⅛-in. & larger	12 6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg. Hvy.
½-in. & smaller	35 28.5
⅝-in. & ¾-in.	29.5 22
⅞-in.-1⅛in.	24 15
1⅛-in. & larger	13 8.5
	Light
½-in. & smaller	35
½-in. to ⅞-in.	28.5
⅞-in. to 1⅛-in.	26

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish ..... 48 & 10

Plated finishes .... 31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:

⅝-in. & smaller	42
¾-in. through 1 in.	34
Longer than 6 in.:	
⅝-in. & smaller	26
¾-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 7.85c

⅞-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers...List to list-plus-$1.

FLUORSPAR

Metallurgical grade, f. o. b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.90

CARBON

35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.25	36.75	31.50
303	43.25	40.25	34.00
304	43.25	38.75	33.00
309	56.00	55.00	44.75
316	57.00	59.00	49.25
321	49.25	48.25	37.00
347	53.75	52.25	41.50
410	36.50	30.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Bait. Types 301-347 sheet, except 303 and 309 E2.

Brackenridge, Pa., Sheets A4 quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 and 0.25c lower on Types 302, 304, 321, 347; 0.50c lower on Types 309 and 316 S15.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c; 303; 56.00c; 316; 52.00c; 347; 30.50c; 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 301 and 45.25c on 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309, 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip, except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol 30.00-35.00

Toluol, one deg. 26.00-33.00

Industrial xylol. 25.00-33.50

Per ton bulk, ovens

Sulphate of ammonia $32-$40

Cents per pound, ovens

Phenol, 40 (carlots, non-returnable drums) ..17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

	Cents
Sponge iron 98+% Fe, carlots, f.o.b. Swedish, c.l.f. New York, in bags	8.85-9.95
Electrolytic Iron: Annealed, 99.5% Fe	42.50
Unannealed, 99 + % Fe	36.50
Unannealed, 99 + % Fe (minus 325 mesh)	58.50
Powder Flakes	48.50
Carbonyl Iron: 97.9-99.8%, size 5 to 10 microns	83.00-148.00
Aluminum: Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	33.50
Antimony	75.85
Brass, 10-ton lots	30.00-33.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 10 ton lots	50.00
Copper: Electrolytic	47.25-46.25
Reduced	33.75-37.00
Lead	25.50
Magnesium	75.00-85.00
Manganese: Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	86.00
Nickel-Silver 10-ton lots	45.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	23.00-30.50
Tungsten	Dollars
Melting grade, 99%, 60 to 200 mesh, freight allowed: 1000 lb and over	6.00
Less than 1000 lb	6.15
98.8% minus 65 mesh, freight allowed: 1000 lb and over	4.15
Less than 1000 lb	4.25
Molybdenum, 99.9% minus 200 mesh	4.25
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvil.fuf.	$14.50-15.00
Connelsvil.fdy.	17.00-18.00
New River foundry	21.30
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearny, N. J. ovens	$22.75
Everett, Mass., Ovens New England, del.	*24.80
Chicago ovens	23.00
Chicago, del.	24.50
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	24.43
Cincinnati, del.	25.85
Detroit, del.	26.85
Ironton, O. ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens	24.00
Cleveland, del.	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Birmingham, del.	21.60
Philadelphia, ovens	22.70
Nevillelsland,Pa.,ovens	23.00
Swedeland, Pa., ovens	22.60
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., ovens	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.89
Flint, del.	26.59
Pontiac, del.	25.47
Saginaw, del.	26.92

* Or within $4.15 freight zone from works.

ELECTRO-PLATERS COMPANY OF MILWAUKEE

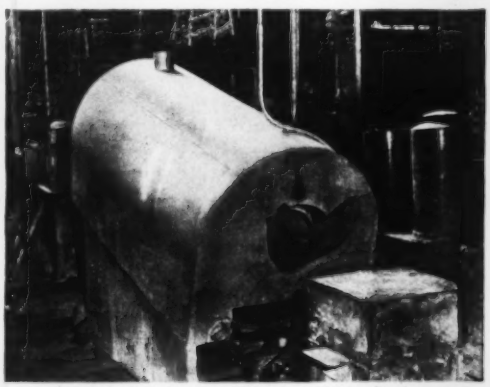
relies on *GAS*

for Efficient, Economical Electro-Plating

Gas immersion burners (at bottom of plating tanks) accurately maintain required plating solution temperatures at Electro-Platers Company, Milwaukee, Wisconsin.

Important factors in the success of the production line technique of plated parts at Electro-Platers Co. are the GAS-fired immersion burners used to heat plating solutions to proper temperatures.

Such diverse items as hub caps, oven door handles, hardware, and dairy industry cylinders are plated in tanks containing Gas-heated solutions. Tanks are fired by Surface Combustion Corporation's 6″ atmosphere burners on immersion tubes. The bulk of the plating is Copper, Nickel, Chromium, Cadmium, and bright Zinc.



Gas-heated rotary-parts dryer speeds production.

ADVANTAGES OF GAS

- **Precise temperature controls maintain exact temperatures.**
- **GAS immersion burners require virtually no maintenance.**
- **GAS burner operation has proved itself economical.**

Throughout Industry, the numerous applications of GAS demonstrate the versatility, economy, simplicity, and efficiency of GAS as an Industrial Fuel. Your local Gas Company Representative can give you the facts about GAS and the advantages of GAS in your production line. Call him today.

MORE AND MORE . . .
THE TREND IS TO GAS
FOR INDUSTRIAL PROCESSING

AMERICAN GAS ASSOCIATION • 420 LEXINGTON AVENUE, NEW YORK 17, NEW YORK

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, for delivery within switching limits, subject to extras.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140‡		Carbon	Floor
New York (city)	6.37	7.21	8.55	7.05	...	6.59	7.53	9.28	6.34	6.71	7.98
JerseyCity(c'try)	6.07	6.91	8.25	6.75	...	6.29	7.23	8.98	6.04	6.41	7.68
Boston (city)	6.40	7.18	8.55	6.35	...	6.25	7.04	9.00	6.40	6.55	7.84
Boston (c'try)	6.20	6.98	8.35	6.15	...	6.05	6.84	9.20	6.20	6.35	7.64
Phila. (city)	6.04	6.97	8.35	6.33	7.11	6.29	7.16	8.92	6.10	6.34	7.39
Phila. (c'try)	5.79	6.72	8.10	6.08	6.86	6.04	6.91	8.67	5.85	6.09	7.14
Balt. (city)	6.22	7.00	8.40	6.23	...	6.21	6.83	...	6.33	6.33	7.57
Balt. (c'try)	6.02	6.80	8.20	6.03	...	6.01	6.63	...	6.13	6.13	7.37
Norfolk, Va.	6.78	...	...	...	...	6.00	7.20	...	6.30	6.30	7.15
Richmond, Va.	5.95	6.57	8.10	6.14	...	5.91	6.59	...	6.22	6.86	7.47
Wash. (w'hse)	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)	5.74	6.52	8.29	6.06	...	5.80	6.65	10.65††	6.00	6.23	7.55
Buffalo (w'hse)	5.54	6.32	8.09	5.86	...	5.60	6.45	10.45††	5.80	6.03	7.35
Pitts. (w'hse)	5.50	6.32	7.85	5.59	6.90	5.45	6.20	10.30††	5.65	5.85	6.89
Detroit (w'hse)	5.75	6.47	8.12	5.76	7.15	5.76	6.64	9.13	6.09	5.85	7.21
Cleveland (del.)	5.74	6.52	8.16	5.85	7.18	5.82	6.60	8.91	6.15	6.02	7.39
Cleve. (w'hse)	5.54	6.32	7.96	5.65	6.98	5.62	6.40	8.71	5.95	5.82	7.19
Cincin. (city)	5.99	6.53	8.44	5.92	...	5.90	6.79	...	6.21	6.29	7.43
Chicago (city)	5.77	6.54	8.08	5.70	...	5.67	6.50	10.47††	5.85	5.92	7.09
Chicago (w'hse)	5.57	6.34	7.88	5.50	...	5.47	6.30	10.27††	5.65	5.72	6.89
Milwau. (city)	5.90	...	8.21	5.85	...	5.83	6.81	10.46††	6.01	6.06	7.25
Milwau. (c'try)	5.70	...	8.01	5.65	...	5.63	6.61	10.26††	5.81	5.86	7.05
St. Louis (del.)	6.02	6.85	8.20	6.00	...	5.95	6.85	10.55	6.22	6.27	7.46
St. L. (w'hse)	5.82	6.65	8.00	5.80	...	5.75	6.65	10.35	6.02	6.07	7.26
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.56	6.60	7.80
Kans.Cty(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90§	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm (w'hse)	5.60	6.40	6.75§	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.50	8.30§	9.55	6.60	10.65	6.45	8.35	...	6.50	6.50	8.75
L. A. (w'hse)	6.30	8.10§	9.35	6.40	10.45	6.25	8.15	...	6.30	6.30	8.55
Seattle-Tacoma	7.04	8.64	9.25	7.04	...	6.70	8.80	10.35	6.54	6.78	8.73
San Francisco	6.62	7.88§	9.10§	6.58	...	6.45	8.20	11.15	6.45	6.37	8.50

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† 16 gage; ‡‡ as annealed; §§ 15 gage. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; ¹—500 to 1499 lb; ²—450 to 1499 lb; ³—3500 lb and over; ⁴—1000 to 1999 lb

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural) tower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail, freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit del. E. Pa.

Foundry and basic 56-62% concentrates contract ... 17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic 60 to 68%:

Spot	17.00
Long-term contract	15.00
North African hematites	17.00
Brazilian iron ore, 68-69%	24.00-25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite mines	65.00

Manganese Ore

Manganese, 48% nearby $1.18-$1.22 per long ton unit, c.i.f. U. S. ports duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.6c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00

Domestic—rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content mines	$1.08

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $75, Palmerton, Pa., $75, Pittsburgh and Chicago, (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $185 per gross ton of alloy, c.l. packed $197, gross ton lots, packed, $212, less gross ton lots, packed, $229, f.o.b. Alloy, W. Va., Niagara Falls, N. Y. or Ashtabula, O. Base price, $187, Johnstown, Pa., $185, Sheridan, Pa., $188, Etna, Pa., $190, Chattanooga, Tenn. $186, Anaconda, Mont.

Shipment from Pacific Coast warehouses by one seller add $33 to above prices f.o.b. Los Angeles, Oakland, Portland, Oreg. Shipment from Chicago warehouse, ton lots $227; less gross ton lots, $244, f.o.b. Chicago. Add or subtract $2.30 for each 1% or fraction thereof of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%) Carload, lump, bulk, max. 0.07% C, 25.75c per lb of contained Mn, carload, packed, 28.6c, ton lots, 27.6c, less ton 28.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, le for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% min., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max.) Carload, lump, bulk 19.15c per lb of contained Mn, carload packed 19.9c, ton lot 21.0c, less ton 22.2c. Delivered. Spot add 0.25c.

Manganese metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload, lump, bulk 44c per lb of metal, packed, 34.75c; ton lot 36.25c, less ton lot 38.25c. Delivered. Spot add 2c.

Manganese Electrolytic: 40,000 lb or more, 35c; 2000 to 39,999 lb 30c, 250 to 1999 lb, 32c. Premium for hydrogen-removed metal 1.5c per pound. f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%) Contract, lump, bulk 1.50% C grade 18-20% Si 9.90c per lb of alloy, carload packed 10.65c, ton lot 11.55c, less ton 12.55c. Freight allowed. For 2% C grade Si 15-17% deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lot 2" x D $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis, spot add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%): Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%): Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max., C 0.4% max.): Contract, ton lot, 2" x D, $4.90 per lb of contained Cb, less ton $4.95. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min., C 0.30 max.): ton lots, 2" x D, $3.75 per lb of contained Cb plus Ta, deld.; less ton lots $3.80.

Silcas Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr, 3-5%, Ti 9-11%, B 0.55-0.75%): Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 3-4%, Al 3-4%, Fe 20% approx.): Contract carload, packed ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%): C.l. packed, 18c per lb of alloy; ton lots 19c; less ton lots 20.50c. f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-8 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 9-11%): C.l. packed, 15c per lb of alloy, ton lots 16.50c, less ton lots 17.75c, f.o.b. Niagara Falls, freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al, Ba; Fe) Lump carload, bulk 14.50c, packed 15.50c, ton lots packed 15.75c, less ton lots, packed 16.25c per lb of alloy, delivered to destination within United States.

Ferrophosphorus: (23-25% based on 24% content with unitage of $3 for each 1% of 1 above or below the base); carloads, f.o.b. sellers' works Mt. Pleasant, or Rigle, Penn., $65 per gross ton.

Ferromolybdenum: (55-75%), Per lb. contained Mo, f.o.b. Langeloth, $1.32; Washington, Pa., furnace any quantity $1.32.

Technical Molybdic-Oxide: Per lb. contained Mo, f.o.b. Langeloth $1.14, packed in bags containing 30 lb of molybdenum; Washington, Pa., $1.13.

NOTE. Current prices on chromium, silicon, vanadium, boron and tungsten alloys appeared on page 189, Feb. 4 issue; calcium, zirconium and briquetted alloys, page 157, Feb. 11. Refractories prices also were published on page 157, Feb. 11 issue.

ELECTRO-PLATERS COMPANY OF MILWAUKEE

relies on *GAS*

for Efficient, Economical Electro-Plating

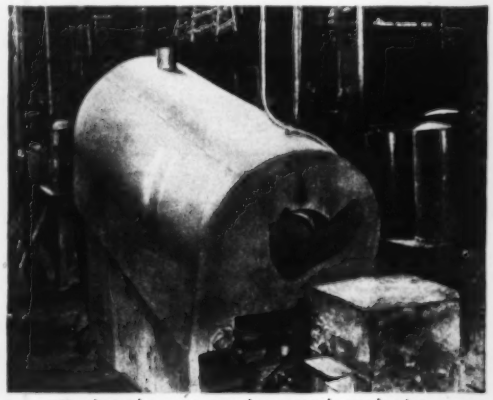
Important factors in the success of the production line technique of plated parts at Electro-Platers Co. are the GAS-fired immersion burners used to heat plating solutions to proper temperatures.

Such diverse items as hub caps, oven door handles, hardware, and dairy industry cylinders are plated in tanks containing Gas-heated solutions. Tanks are fired by Surface Combustion Corporation's 6" atmosphere burners on immersion tubes. The bulk of the plating is Copper, Nickel, Chromium, Cadmium, and bright Zinc.

Gas immersion burners (at bottom of plating tanks) accurately maintain required plating solution temperatures at Electro-Platers Company, Milwaukee, Wisconsin.

ADVANTAGES OF GAS

- **Precise temperature controls maintain exact temperatures.**
- **GAS immersion burners require virtually no maintenance.**
- **GAS burner operation has proved itself economical.**



Gas-heated rotary-parts dryer speeds production.

Throughout Industry, the numerous applications of GAS demonstrate the versatility, economy, simplicity, and efficiency of GAS as an Industrial Fuel. Your local Gas Company Representative can give you the facts about GAS and the advantages of GAS in your production line. Call him today.

MORE AND MORE... THE TREND IS TO GAS FOR INDUSTRIAL PROCESSING

AMERICAN GAS ASSOCIATION • 420 LEXINGTON AVENUE, NEW YORK 17, NEW YORK

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, for delivery within switching limits, subject to extras.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	o.h. Rds.	C.F. Rds.	H.R. Alloy 4140‡§		Carbon	Floor
New York (city)	6.37	7.21	8.55	7.05	...	6.59	7.53	9.28	6.44	6.71	7.98
JerseyCity(c'try)	6.07	6.91	8.25	6.75	...	6.29	7.23	8.98	6.04	6.41	7.68
Boston (city)	6.40	7.18	8.56	6.35	...	6.25	7.04	9.00	6.40	6.55	7.84
Boston (c'try)	6.20	6.98	8.35	6.15	...	6.05	6.84	9.20	6.20	6.35	7.64
Phila. (city)	6.04	6.97	8.35	6.33	7.11	6.29	7.16	8.92	6.10	6.34	7.39
Phila. (c'try)	5.79	6.72	8.10	6.08	6.86	6.04	6.91	8.67	5.85	6.09	7.14
Balt. (city)	6.22	7.00	8.40	6.23	...	6.21	6.83	...	6.33	6.33	7.57
Balt. (c'try)	6.02	6.80	8.20	6.03	...	6.01	6.63	...	6.13	6.13	7.37
Norfolk, Va.	6.78	...	...	...	...	6.00	7.20	...	6.30	6.30	7.15
Richmond, Va.	5.95	6.57	8.10	6.14	...	5.91	6.59	...	6.22	6.86	7.47
Wash. (w'hse)	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)	5.74	6.52	8.29	6.06	...	5.80	6.65	10.65††	6.00	6.23	7.55
Buffalo (w'hse)	5.54	6.32	8.09	5.86	...	5.60	6.45	10.45††	5.80	6.03	7.35
Pitts. (w'hse)	5.50	6.32	7.85	5.59	6.90	5.45	6.20	10.30††	5.65	5.65	6.89
Detroit (w'hse)	5.75	6.47	8.12	5.78	7.15	5.76	6.64	9.13	6.09	5.88	7.21
Cleveland (del.)	5.74	6.52	8.16	5.85	7.18	5.82	6.60	8.91	6.15	6.02	7.39
Cleve. (w'hse)	5.54	6.32	7.96	5.65	6.98	5.62	6.40	8.71	5.95	5.82	7.19
Cincin. (city)	5.99	6.53	8.44	5.92	...	5.99	6.79	...	6.21	6.29	7.43
Chicago (city)	5.77	6.54	8.08	5.70	...	5.67	6.50	10.47††	5.85	5.92	7.09
Chicago (w'hse)	5.57	6.34	7.88	5.50	...	5.47	6.30	10.27††	5.65	5.72	6.89
Milwau. (city)	5.90	...	8.21	5.85	...	5.83	6.81	10.46††	6.01	6.06	7.25
Milwau. (c'try)	5.70	...	8.01	5.65	...	5.63	6.61	10.26††	5.81	5.86	7.05
St. Louis (del.)	6.02	6.85	8.20	6.00	...	5.95	6.85	10.55	6.22	6.27	7.46
St. L. (w'hse)	5.82	6.65	8.00	5.80	...	5.75	6.65	10.35	6.02	6.07	7.26
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
Kans.City(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90‡	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm (w'hse)	5.60	6.40	6.75‡	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.50	8.30§	9.55	6.60	10.65	6.45	8.35	...	6.50	6.50	8.75
L. A. (w'hse)	6.30	8.10§	9.35	6.40	10.45	6.25	8.15	...	6.30	6.30	8.55
Seattle-Tacoma	7.04	8.64	9.25	7.04	...	6.70	8.80	10.35	6.54	6.78	8.73
San Francisco	6.62	7.88§	9.10§	6.58	...	6.45	8.20	11.15	6.45	6.37	8.50

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded); and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; ** 16 gage; †† as annealed; ‡‡ 15 gage. Base quantities, 2000 to 9999 lb except as noted. Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; ‡—500 to 1499 lb; §—450 to 1499 lb; ¶—3500 lb and over; ¶—1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural); lower lake ports.

After adjustment for analysis prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail, freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit del. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	17.00
Brazilian iron ore	24.00-25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite mines	65.00

Manganese Ore

Manganese, 48% nearby $1.1a-$1.22 per long ton unit, c.i.f. U. S. ports duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79 8-81 6c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.5:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00
South African Transvaal	
44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00
Brazilian	
44% 2.5:1 lump	$32.00
Rhodesian	
45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic—rail nearest seller	
48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content, mines	$1.08

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlots per gross ton, $75, Palmerton, Pa.; $75, Pittsburgh and Chicago. (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $185 per gross ton of alloy, c.l. packed $197, gross ton lots, packed, $212; less gross ton lots packed, $229; f.o.b. Alloy, W. Va., Niagara Falls, N. Y. or Ashtabula, O. Base price, $187, Johnstown, Pa., $185, Sheridan, Pa., $188, Etna, Pa., $190, Chattanooga, Tenn., $186, Anaconda, Mont.

Shipment from Pacific Coast warehouses by one seller add $33 to above prices f.o.b. Los Angeles, Oakland, Portland, Oreg. Shipment from Chicago warehouse, ton lots $227; less gross ton lots, $244, f.o.b. Chicago. Add or subtract $2.30 for each 1% or fraction thereof of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%) Carload lump, bulk, max. 0.07% C, 25.75c per lb of contained Mn, carload packed 28.5c, ton lots 27.6c, less ton 28.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% min., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max.) Carload lump, bulk 19.15c per lb of contained Mn, carload packed 19.9c, ton lot 21.0c, less ton 22.2c. Delivered. Spot add 0.25c.

Manganese metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload, lump bulk, 44c per lb of metal; packed, 34.75c; ton lot 36.25c, less ton lot 38.25c. Delivered. Spot add 2c.

Manganese Electrolytic: (40,000 lb or more, 37c, 2000 to 39,999 lb, 30c, 250 to 1999 lb, 32c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%) Contract, lump, bulk, 1.50% C grade, 14-20% Si, 9.90c per lb of alloy, carload packed, 10.65c, ton lot 11.55c, less ton 12.55c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%) Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%) Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max., C 0.4% max.) Contract, ton lot, 2" x D, $4.90 per lb of contained Cb; less ton $4.95. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min., C 0.30 max.) ton lots, 2" x D, $3.75 per lb of contained Cb plus Ta, deld.; less ton lots $3.80.

Silcaz Alloy: (Si 40-40%, Ca 9-11%, Al 6-8%, Zr, 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 3-4%, Al 3-4%, Fe 20% approx.) Contract carload packed ¼" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18c per lb of alloy, ton lots 19c; less ton lots 20.50c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-S Foundry Alloy: (Cr 35-42%, Si 17-19%, Mn 9-11%) C.l. packed 15c per lb of alloy, ton lots 16.50c; less ton lots 17.75c, f.o.b. Niagara Falls, freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al, balance Fe). Lump carload, bulk 14.50c, packed 15.50c, ton lots packed 15.75c, less ton lots, packed 16.25c per lb of alloy, delivered to destination within United States.

Ferrophosphorus: (23-25% based on 24% content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. sellers' works Mt. Pleasant, or Rigle, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb. contained Mo, f.o.b. Langeloth, $1.32; Washington, Pa., furnace, any quantity $1.33.

Technical Molybdic Oxide: Per lb. contained Mo, f.o.b. Langeloth $1.14, packed in bags containing 20 lb of molybdenum; Washington, Pa., $1.13.

NOTE. Current prices on chromium, silicon, vanadium, boron and tungsten alloys appeared on page 189, Feb. 4 issue; calcium, zirconium and briquetted alloys, page 157, Feb. 11. Refractories prices also were published on page 157, Feb. 11 issue.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Stabilization ceiling price regulation No. 3, as amended Feb. 6, 1952

STEELMAKING SCRAP COMPOSITE

Feb. 14	$43.00
Feb. 7	43.00
Jan. 1952	43.00
Feb. 1951	44.00
Feb. 1947	33.50

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin:

Basing Point	Grade 1 No. 1 Bundles Dealer, Industrial	Grade 1 No. 1 Heavy Melt Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Pt., Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 1 Bushelling	Base
3. No. 1 Heavy Melting	—$1.00
4. No. 2 Heavy Melting	— 1.00
5. No. 2 Bundles	— 1.00
6. Machine Shop Turnings	—10.00
7. Mixed Borings and Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Bushelling	— 4.00
10. Cast Iron Borings	— 6.00

Elec. Furnace and Fdry. Grades

11. Billet, Bloom & Forge Crops	+ 4.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry, Steel:	
20. 2 feet and under	Base
21. 1 foot and under	+ 2.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free Turnings	— 3.00
24. Heavy Turnings	— 1.00
25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00
30. Old Tin & Terne Plated Bundles	—10.00

Unprepared Grades

When compressed constitutes:

32. No. 1 Bundles	— 6.00
33. No. 2 Bundles	— 9.00
34. Other than material suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer, otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.

(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27 for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and acid open-hearth furnaces or foundries, or in basic O-H or blast furnace under NPA allocation or OPS authorization.

(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars or 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, radio scrap, salamander scrap, skulls, skimmings of scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.

(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 bundles less $15.00.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap:

2. No. 2 Heavy Melting Steel	—$2.00
3. No. 2 Steel Wheel	Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats	Base
5. No. 1 Bushelling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, Switches, Tubes & Pipes	Base
10. Structural Wrought Iron and/or steel, uncut	— 8.00
11. Structural, Cut	— 9.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Steel Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angles, Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+ 12.00
26. Steel Wheels, No. 3 Over-size	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	+ 8.00
32. Boilers	— 6.00
33. No. 2 Sheet Scrap	—13.00
34. Carsides, Doors, Car Ends, cut apart	— 6.00
35. Unassorted Iron & Steel	— 6.00
36. Unprepared scrap, not suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses, otherwise, ceiling shall not exceed that for Grade 14.

(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise ceiling shall not exceed that for No. 1 heavy melting steel.

(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1).

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:

1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 2 charging box cast.

(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 3, No. 4 or No. 2, $8.

(2) For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 5, $8.

(3) For crushing Grade No. 6, $3. For preparing into:

(4) Grade No. 25, $6.

(5) Grade No. 19, $6.

(6) Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.

(7) Grade No. 17 or No. 21, $11.

(8) Grade No. 18, $12.

(9) For hydraulically compressing Grade No. 15, $8.

(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.

(2) For hydraulically compressing Grade No. 13, $6.

For preparing into:

(3) Grade No. 16, $4.

(4) Grade No. 17, $5.

(5) Grade No. 18, $7.

(6) Grade No. 21, $4.

(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $9.

(2) For preparing Grade No. 4 into Grade No. 11, $7.

(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commission shall be payable to a broker in excess of $1.

Premium for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and noncooperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.

Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 53c; Butler, Pa., 65c.

Canton, O., 51c; Chicago (including Gary, Ind.) $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.

Coatesville, Pa., 50c; Conshohocken, Pa., 20c.

Detroit, 95c; Duluth, Minn., 50c.

Harrisburg, Pa., 51c; Houston, 57c.

Johnstown, Pa., 75c.

Kansas City, Mo., 78c; Kokomo, Ind., 51c.

Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.

Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.

St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c.

Warren, Pa., 75c; Weirton, 70c; Youngstown, 73c.

HAMILTON, ONT.

(Delivered Prices)

Heavy Melt	$45.00
No. 1 Bundles	35.00
No. 2 Bundles	35.00
Mechanical Bundles	31.50
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	32.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Bushelling	29.50
Bushelings new factory:	
Prep'd.	33.00
Unprep'd.	31.00
Short Steel Turnings	32.00
Cast Iron Grades*	
No. 1 Machinery Cast	55.00

* F.o.b. shipping point.

SCRAP

for your every requirement

LURIA BROTHERS AND COMPANY, INC.

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Genesee Building

CHICAGO, ILLINOIS
100 W. Monroe St.

CLEVELAND, OHIO
1022 Midland Bldg.

DETROIT, MICHIGAN
2011 Book Building

HOUSTON, TEXAS
1114 Texas Av. Bldg.

LEBANON, PENNA.
Luria Building

NEW YORK, N. Y.
100 Park Avenue

PITTSBURGH, PA.
Oliver Building

PUEBLO, COLORADO
334 Colorado Bldg.

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The Metal Market

Producers of civilian goods will receive supplementary allocations of metals in second quarter, due chiefly to rescheduling of certain defense programs

LARGER tonnages of metals are being made available to producers of consumer durable goods. You will benefit almost immediately if you can qualify under the requirements set up by Washington officials; otherwise, a gain in your metal receipts probably will be delayed until later in the year.

Under the present pattern of distribution, industries in localities having serious unemployment problems will receive preferential treatment. This works to the advantage of firms in the Detroit area, for instance, and to the possible disadvantage of those in certain other areas.

Balancing Act—As a second important consideration, additional tonnages of metals will be allotted only to those consumers who have balancing supplies of other materials. An additional 1 million pounds of aluminum will be made available to the automobile industry for second quarter production "only on the basis of the demonstrated need of individual companies for the additional materials to bring about a better balance with previously allotted amounts of copper. Unfortunately, no additional allotments of copper to the industry are possible for the second quarter," says Manly Fleischmann, defense production administrator. The nation is in the period of greatest difficulty occasioned by demands for defense production, he added.

Additional supplementary allocations of 4.5 million pounds of aluminum and 3.5 million pounds of brass mill products were expected to be made to industry in general by NPA late last week. Part of these tonnages is being made available as a result of rescheduling of certain defense programs.

Look for an easing in restrictions on use of aluminum to provide for the substitution of aluminum wiring for copper wiring in commercial construction. No ratio of aluminum to copper wiring has been decided by NPA, but a ratio of 1 pound of aluminum to 2 pounds of copper is being considered.

Capacity Goal Lifted—You are assured of substantially larger supplies in the future as producers continue to enlarge their expansion programs. Reynolds Metals Co. will build a $30 million aluminum plant at Gum Springs, Ark. This plant will have an annual capacity of 55,000 tons of pig aluminum and will be in operation early next year.

Brighter supply prospects are in sharp contrast to the present stringency. Aluminum Co. of America, Pittsburgh, was forced to curtail operations at its extrusion plants in Cressona, Pa., New Kensington, Pa., and Lafayette, Ind. The curtailment was necessary because of a reduction in the amount of aluminum permitted by NPA to be manufactured into extruded shapes during the first quarter of this year.

Lead, Zinc Duties Suspended

A marked improvement in the lead and zinc supply situation is developing. As a result of suspension of tariffs on lead and zinc, effective as of Feb. 12, you will be able to obtain larger tonnages of foreign metal at favorable prices. Metal will come in duty free until Mar. 31, 1953, or until the end of the emergency, whichever comes first. The duties would be reimposed should the United States price for either metal fall below 18.00c a pound.

An additional 26,250 tons of Guatemalan pig lead will be made available to American industry for defense purposes over a five-year period under terms of a contract announced by Defense Materials Procurement Agency. The agreement calls for expansion of facilities at Compania Minera de Huehuetenango's lead mine located in the Huehuetenango district, Guatemala. The company will finance a $400,000 expansion program, including construction of a 75-ton flotation mill, housing, roads and mining facilities, which are expected to be completed in two years. Deliveries are scheduled to begin in 1954.

Users of zinc received 75,039 tons of slab zinc in January, the largest receipts since July of last year. At the same time stocks at the end of the month rose to 26,703 tons, the largest recorded since June, 1950. Production was slightly higher in January at 83,205 tons compared with 81,769 tons in the preceding month. Unfilled orders at the end of last month came to 55,760 tons compared with 50,509 at the end of December.

Nickel Expansion Goal Set

United States was allocated 22,951 metric tons of nickel, or 70 per cent of the 33,583 tons available for distribution in the first quarter to member governments of the International Materials Conference.

Efforts are being made to obtain increased production from all possible sources. An expansion goal to provide an anticipated 132,000 short tons of nickel from foreign and domestic production in 1954 has been set by DPA.

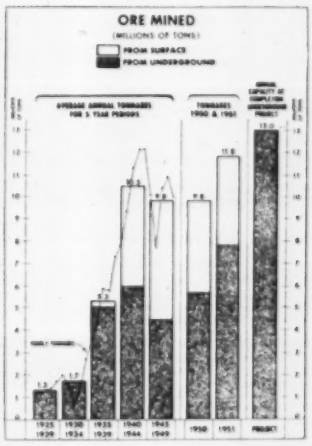
The 1950 supply amounted to 100,500 tons, including: Domestic primary production, 900 tons; domestic scrap, 8000 tons; imports 91,000 tons. The 1954 production goal includes: Domestic primary production, 1400 tons; domestic scrap, 9000 tons; imports, 121,600 tons.

Nicaro nickel plant in Oriente province, Cuba, is back in production. Four of this plant's twelve furnaces are working 24 hours a day and the rest are scheduled to be brought into operation during the next four months. The plant will then be producing nickel at a rate of about 30 million pounds a year. This is equivalent to about 10 per cent of the world's annual nickel production in pre-Korean year of 1949.

Nickel Output Sets Record

Operating at maximum capacity in 1951, International Nickel Co. of Canada Ltd., Copper Cliff, Ont., increased its rate of nickel production to 21 million pounds a month. This represented an increase of 5 per cent over the rate prevailing prior to mid-year.

The company also pushed towards completion its extensive underground development program initiated during World War II and mined more ore from underground than in any year in its history. Production of ore from underground in 1951 was 7,780,000 tons, an increase of 2 million tons over that of the previous year. Total ore mined from both underground and surface operations was



11.8 million tons compared with 9,849,000 tons in 1950.

"By the end of 1953, when production from surface operations will be fully replaced," Dr. John F. Thompson, chairman and president, says, "the company will be able to hoist 13 million tons of ore a year, which is twice as much from underground as in any year prior to 1951."

Tin Contract Sought

Satisfactory progress is reported unofficially in negotiations in Washington for an Indonesian tin contract. Neither RFC nor the Indonesian Mission has revealed details as to the probable price, length of contract, or quantities to be shipped. Tin shipments to this country from Indonesia halted upon expiration of a contract last December. Indonesia produced 32,102 long tons of tin in concentrates in 1950.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 40.00c; 80-10-10 (No. 305) 33.00c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 19.50c; brass special 19.75c; intermediate 20.00c; East St. Louis high grade 20.85c, delivered.

Lead: Common 18.80c; chemical 18.90c; corroding 18.90c; St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c; pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.80c; grade 2, 18.60c; grade 3, 18.40c; grade 4, 18.20c.

Magnesium: Commercially pure (99.8%+) sand and ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 121.50c.

Antimony: American 99.99.8% and over but not meeting specifications below 50.00c; 99.8% and over, arsenic 0.05% max., other impurities 0.1% max 50.50c, f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 56.50c; 25-lb pigs, 58.50c; "A" nickel shot 60.12c; "F" nickel shot or ingots, for addition to cast iron 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $263 per 76-lb flask.

Beryllium Copper: 3.75-4.25% Be, $1.50 per lb of alloy, f.o.b. Reading, Pa.

Cadmium: "Regular" straight or flat forms $2.50, del; special or patented shapes $2.80.

Cobalt: 97.99% $2.40 per lb for 500 lb (keg); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury $35 per ounce.

Silver: Open market, New York 88.00c per oz.

Platinum: $90-$95 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Mill prices, cents per pound, f.o.b. mill, effective Aug. 23, 1951)

Sheet: Copper 41.98; yellow brass 38.28; commercial bronze, 95% 41.61, 90% 41.13; red brass, 85% 40.14, 80% 39.67; best quality 39.15; nickel silver, 18% 53.14; phosphor bronze grade A, 5% 61.07.

Rod: Copper (not-rolled 31.33, cut drawn 38.58; yellow brass free cutting 32.63; commercial bronze 95% 41.30, 90% 40.82; red brass 85% 39.83, 80% 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.24; commercial bronze, 90% 43.29; red brass, 85% 43.05.

Wire: Yellow brass 38.21; commercial bronze 95% 41.30, 90% 41.42; red brass, 85% 40.43, 80% 40.96; best quality brass 39.44.

(Base prices effective Dec. 26, 1951)

Copper Wire: Bare, soft, f.o.b. eastern mills, 100,000 lb lots 28.34c, 30,000 lb lots, 28.67 c.l., 29.17. Weatherproof, 100,000 lb, 30.35; 30,000 lb, 30.86, c.l., 31.10. Magnet wire, del. 15,000 lb or more 34.56; c.l., 35.25.

ALUMINUM

(30,000 lb base, freight allowed on 500 lb or more, but not in excess of rate applicable on 10,000 lb c.l. orders)

Sheets and Circles: 2s and 3s mill finish c.r.

Thickness Range Inches	Widths of Diameters, Sheet In. Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circles Base
0.249-0.136	12-48	30.4	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) of distance across flats	Round— B317-T4, 17S-T4	B-317-T4	Hexagonal— 17S-T4	B-317-T4
0.125	52.0	...	...	...
0.156-0.0188	44.0	...	...	...
0.219-0.313	41.5	...	...	...
0.375	40.0	46.0	48.0	...
0.406	40.0	...	...	...
0.438	40.0	46.0	48.0	...
0.469	40.0	...	...	...
0.500	40.0	46.0	48.0	...
0.531	40.0	...	...	...
0.563	40.0	...	...	45.0
0.594	40.0	...	...	...
0.625	40.0	43.5	45.0	...
0.688	40.0	...	45.0	...
0.750-1.000	39.0	41.0	42.5	...
1.063	39.0	...	41.0	...
1.125-1.500	37.5	39.5	41.0	...
1.563	37.0	...	...	...
1.625	36.5	...	...	39.5
1.688-2.000	36.5	...	...	...

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh; Sheets, Full rolls, 140 sq ft or more $24.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe, Full coils $24.00 per cwt. Traps and bends: List prices plus 65%.

ZINC

Sheets 26.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 25.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 25.50 26.50c; over 12-in., 25.50-26.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes 71.00c. Plates, 73.00c. Seamless tubes, 106.00c.

MONEL

(Base prices f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c

TITANIUM

(Prices per lb 10,000 lb and over, f.o.b. mill) sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads 27.00c, 5 tons and over 27.50c, 1 to 5 tons 28.00c, less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled 38.34c, oval 37.86.

Nickel Anodes: Rolled oval, carbonized, carloads 74.50c, 10,000 to 30,000 lb 75.50c; 3000 to 10,000 lb, 76.50c; 500 to 3000 lb 77.50c; 100 to 500 lb 78.50c; under 100 lb 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.00c in 100 lb bags, 34.00c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb to consumers 86.7c; 100 or 350 lb drums only, 100 to 600 lb 71.6c, 700 to 1900 lb 68c, 2000 to 9900 lb, 67.3c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.325; 500 to 999 lb, $1.38; 200 to 499 lb, $1.385; less than 200 lb, $1.40. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c, 10 or more drums, 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.11, more than 2000 lb, $1.09. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbls 98.5c; 100 lb kegs 99.5c. Freight allowed

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean, Heavy	Rod Ends	Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	18.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. Bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group 1: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 18.50; No. 1 composition borings 19.25 per lb of Cu content plus 63 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 60 cents per lb of tin content; unlined red car boxes 18.25; lined red car boxes 17.25; cocks and faucets 16.00; mixed brass screens 16.00; navy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment) Unsweated zinc dross, 13.75c; new clippings and trimmings, 15.50c; engravers' and lithographers' plates, 15.50c; die cast slabs, min 90% zinc, 13.75c; old zinc scrap, 12.25c; forming and stamping dies, 12.25c; new die cast scrap, 11.75c; old zinc die cast radiator grille 11.50c; old die cast scrap, 10.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 19.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb, or a flat price of 11.25c a pound of battery plates. Used storage batteries (in boxes; drained of liquid, 7.65c for 15,000 lb or more; 7.45c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap, or lead content of lead-covered cable scrap, 17.25c in lots of 20,000 lb or more; 16.50c in lots under 20,000 lb.

Aluminum Scrap Ceiling Prices

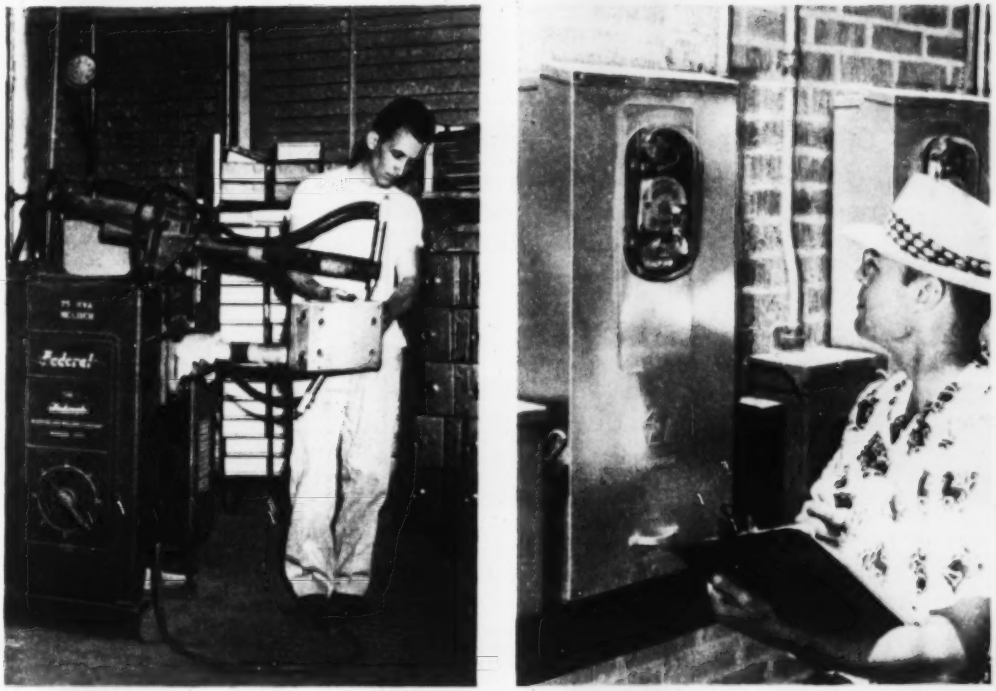
(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00; dural type, 9.00. Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

DAILY PRICE RECORD

1952	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Feb. 1-14	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
Jan. Avg.	24.50	18.80	19.50	109.404	19.00	50.00	56.50	88.00
Jan. 22-31	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
Jan. 2-21	24.50	18.80	19.50	103.00 -	19.00	50.00	56.50	88.00
1951								
Dec. Avg.	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
Nov. Avg.	24.50	18.80	19.50	103.00	19.00	44.56	56.50	88.00
Oct. Avg.	24.50	18.726	19.426	103.00	19.00	42.00	56.50	88.12
Sept. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	112.962	19.00	42.00	56.50	88.49;

NOTE: Copper, electrolytic del. Conn. valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits del. New York; Aluminum primary ingots, 99% del; Antimony bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.



Neat, strong welds accomplished on electric meter enclosures manufactured by Corpus Christi Sheet Metal Works. Aluminum is joinable by any standard process.

Switch to aluminum improves product, cuts costs

By changing from steel to aluminum several years ago, the Corpus Christi Sheet Metal Works was able to produce a greatly improved electric meter enclosure, with production costs substantially reduced.

In use from the Gulf Coast to the Texas desert, steel boxes required protective paint to guard against corrosive salt air and to reflect intense heat away from wax recording instruments. But the paint chipped and peeled, permitting destructive contamination of the metal. And insufficient reflectivity was provided.

Unlike steel, boxes made of *corrosion-resistant* aluminum require no additional protection. Aluminum's *high heat reflectivity* keeps box interiors far cooler. Its clean, neat appearance makes a better-looking installation. And because aluminum is both *strong* and *durable*, boxes give long life in rugged service.

Thanks to aluminum's *workability*, stamping, shearing and forming operations were accomplished more easily, and at less cost. Because *lightweight* aluminum is so easy to handle, faster production was possible.

Let a Kaiser Aluminum engineer help you determine if aluminum is the answer to your design or production problems. His services are available at no obligation or cost. Call any office for complete information, and for current availability. 65 Kaiser Aluminum offices and warehouse distributors in principal cities. Kaiser Aluminum & Chemical Sales, Inc., Oakland 12, California.

Kaiser Aluminum

Setting the pace—through quality and service

Modern Handling System Reduces MACHINE DOWNTIME

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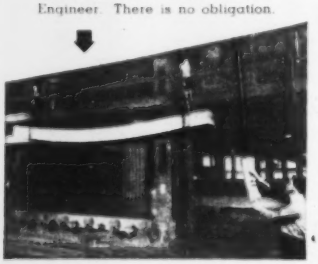

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Tin Plate . . .

Tin Plate Prices, Page 172

Washington—Export licensing quota of 75,000 short tons of secondary tin plate for food, petroleum packaging and other end-uses has been set up for first quarter by the Office of International Trade. Fourth quarter, 1951, quota was 33,335 tons.

Pittsburgh—Softening is reported in tin plate. Different opinions can be had for the asking on the prospects for the current year. Some see demand as good as last year; others view the next 10 months with tongue in cheek. Some spokesmen advocate immediate removal of governmental controls if business stays at present levels.

Chicago—Tin plate is rapidly becoming adequate in supply. The condition arises from high-level output and limitations on use. Secondary tin mill products are backing up substantially at both producers' plants and warehouses and sentiment for decontrol is growing. Long ternes are following a parallel pattern as result of lower automobile manufacture and building construction.

Sheets, Strip . . .

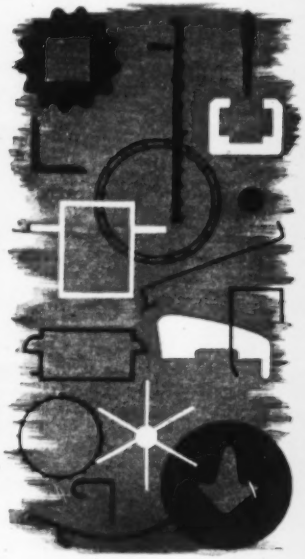
Sheet and Strip Prices, Page 171 & 172

Cleveland—Easier supply conditions in the light, flat-rolled products are reported on every side. Still, the mills are heavily booked into second quarter and few report difficulty filling open spaces in schedules arising from order cancellations or deferments. Some trouble is experienced in disposing of seconds and rejects. But even here, it is said, buyers are being found without too much difficulty. Generally, it is felt if restrictions on use in civilian goods industries were lifted, acute supply conditions would be quickly in evidence. Part of the difficulty at present stems from the fact many prospective buyers lack CMP tickets.

Boston—In varying degree, more sheet and strip tonnage is available. Even hot-rolled carbon and galvanized show signs of slight easing in second quarter. There are openings in strip schedules, both carbon and alloys, and cold-rolled sheet offerings are taken up less freely. Slowing down in demand for flat-rolled is attributed to several reasons. These include lack of tickets, slow sales of finished fabricated products, low nonferrous allotments which in some cases fix production and inventories. Direct defense needs are gradually growing, but in flat-rolled have not balanced the slack in other directions. Steel procurement by Springfield armory is heavier. It is now closing bids on 1190 tons of strip and barrel blanks.

New York—While producers of cold-rolled sheets and strip report easing demand pressure, few, if any, are concerned over their ability to keep facilities operating at high level over the next few months. There have been some deferments to second quarter on tonnage originally scheduled for the current quarter and also a few cancellations.

Philadelphia—Except for galvanized sheets, there is a broad easing in supply of the major light flat products. This does not mean, how-



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ever, sheet tonnage is going begging. There are spot openings but they are being promptly filled. Diversion of more strip capacity to plate is contributing to a relatively firm situation in hot rolled material compared with cold rolled sheets and strip.

Pittsburgh—Inventory and schedule adjustments in the automotive industry are holding demand for cold-rolled material at lower levels approximating a nearer supply-demand balance. Silicon sheets are relatively easy but hot-rolled and certain specialities, such as galvanized, continue tight. It is expected there will be many unplaced second quarter CMP tickets in this area. Contrary to reports from other districts, mills here have no difficulty disposing of their rejects and seconds.

Cincinnati—District sheet mills are near completion of second quarter order booking. The easier market has enabled most fabricators to build up inventories.

Chicago — Makers of cold-rolled sheets and strip are fully booked through second quarter but offerings from mills outside the district indicate the easing which is taking place. Hot-rolled products continue tight despite the fact cold-rolled are being substituted to an expanding degree.

Steel Bars . . .

Bar Prices, Page 171

Boston — Second quarter capacity for open-hearth alloy bars and electric furnace hot-rolled is not filling with the same pressure experienced in earlier quarters. Tool steel bar supply more than balances demand, but hot and cold-rolled carbon tonnage, notably larger quality sizes, boils over beyond June. One eastern producer has halted production of five and one-half inch rounds, further contracting capacity in larger sizes. Textile mill equipment builders are taking less bar tonnage, but direct defense needs, fuzes, shells, rocket parts and forgings are mounting. Cold-finished converters are taking in full allocations for second quarter. Alloy users are slow to adopt boron grades. Some are using boron steels for chain pins, screws etc. Boron steel production will approximate 50,000 tons in February against 26,000 tons in August.

New York—Most sellers of hot alloy bars are virtually out of the market for second quarter on open-hearth quality material. Electric furnace alloys are not so stringent, but producers are making every effort to discourage consumers of open-hearth quality from turning to electric furnace grades. Producers are confident that before second quarter begins they will have enough business to fully engage their electric furnace capacity. Hot carbon bars remain scarce.

Philadelphia — No easing in pressure for carbon bars is apparent. Producers not only are confronted with more tonnage than they can accept, but they are having difficulty getting caught up on back commitments. This latter situation is complicating matters for converters, particularly cold drawers, who are being fairly deluged with demand, including special directives for military needs which call for a considerable revision in schedules. Already some second

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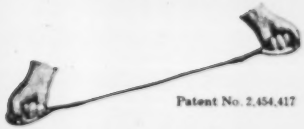

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quarter tonnage is being pushed into third quarter, cold drawers report.

Pittsburgh—Military demands for bars in sizes 2-in. and larger are keeping supplies on the tight side. Requests for tonnage on defense account, coupled with restricted hot-topped steel capacity, will keep supply short for some time into the future. Mills see no early easing in military needs. Second quarter books are about filled and uncashed CMP tickets are circulating among the mills here with no success in finding open rolling time.

Cleveland—No early relief in tight bar supply conditions is seen with military and related demands mounting. The mills are in receipt of more directives. Additional military requirements are reported in the offing. One directive is reported for 50,000 tons for fuzes.

Chicago—Growing impact of the shell program will keep heavy bars in the tight supply category for some time to come. At present producers are unable to accommodate fully demand for forging grades. Smaller sizes, however, are noticeably easier. Cold-finished bars continue tight although consumer pressure has moderated.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 171

Seattle—Rolling mills are producing at capacity but new business is slack. Order backlogs are shrinking. School construction is active and several small reinforcing tonnages have been placed.

Tool Steel . . .

Tool Steel Prices, Page 171

Pittsburgh—Definite easing in demand for tool steels has been felt in this district due to cutbacks in automotive production.

Plates . . .

Plate Prices, Page 171

Philadelphia—Heavier gages of plates, especially ¾-in. and over, are in strong demand for pressure vessels, condensers and boilers. Lighter gages are being stimulated to some extent by seasonal pickup in demand for fuel oil tanks for domestic and commercial installation this spring. There should be some improvement soon for household heating boilers. There is not the stringency in the lighter thicknesses due in part to increasing amount of strip plate which helps particularly in the ⅛ to ¼-in. range. The large Navy contract recently booked by the New York Shipbuilding Corp., Camden, N. J., is still mainly in the paper stage with steel requirements not definitely compiled.

Boston—Only in lighter gages has plate supply improved. Lack of late second quarter tickets has retarded disposal of all this tonnage off strip mills. Heavier plates, notably higher quality carbon grades, are booked through second quarter. Pulp and paper mill equipment, chemical industry and weldment shops, in addition to defense requirements, including rolled armor plate, take substantial volume. Clad plates are also needed by paper mills and chemicals. Paper-making processes are tough on carbon grades. Many shops ordering lighter plates in sizes and specifications normally rolled on sheared plate mills, may have to accept tonnage from strip mills and weld to sizes required.

New York—Sheared and universal plates continue scarce although there is some easing in strip plate, due to less pressure on strip mills for the light material. Prospects are there will be sufficient demand to absorb all plate tonnage, light as well as heavy gages, in second quarter.

Pittsburgh—District mills see tight plate supply continuing for months—perhaps until end of the year. Some easing in supply of the lighter gages has resulted from increased strip mill production. Heavier mills are jammed with orders.

Chicago—Requirements for heavy plates holds strong but most fabricators appear to have sufficient tonnage on hand to maintain shop schedules. Most of the difficulty is imbalance in sizes and grades. Lighter and narrower plates seem to be moving out of the woods progressively.

Structural Shapes . . .

Structural Shape Prices, Page 171

Washington—Construction Industry Advisory Committee last week recommended to the National Production Authority that there be no further restriction in use of structural steel in commercial building and that use of foreign and salvage steel be permitted without specific NPA approval.

The committee also recommended there be no limitations in the housing order based upon amounts of materials used per square foot or the number of bathrooms. It urged limitations be based only on the use of maximum amounts of copper and steel per housing unit.

NPA now is studying a report on third and fourth quarter requirements for completing industrial expansion projects under way, as well as defense and atomic energy construction. When completed the study will enable NPA to better decide what projects can be permitted and to make allotments for the projects for possible use in fourth quarter.

The previously announced allotment of 213,000 tons of structurals for the second quarter to the Facilities & Construction Bureau has been raised to 265,000 tons. This compares with 300,000 in the fourth quarter last year and 370,000 for the first quarter this year. Requirements for the third and fourth quarters are estimated at 225,000 tons each.

The committee was told there should be gradual improvement in the structural steel situation and that allotments for the second quarter have been determined and mill schedules can get underway. The great shortage of wide-flanged beams will continue, however, and greater use of narrower steel sections is urged.

New York—To relieve unemployment in the building field, Washington is reported planning to lift certain restrictions on construction in

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this area. Schools, fire houses and institutional buildings regarded essential to civilian needs would be affected. Talk continues to be heard of the state purchasing foreign steel to help facilitate New York's road program and to relieve unemployment. To date, however, little foreign steel has been bought for this work with shapes 7.00c to 8.00c per pound, New York, as against a minimum delivered price here of a little more than 4.00c on domestic steel.

Boston—Supporting the contention an easing in fabricated structural steel will be apparent by late third quarter is the fact bulk of tonnage required for several large industrial expansions has gone through the shops. This includes steel industry expansion. Most structural steel needed for heavier aluminum output is to be fabricated by July. If restrictions hold on new construction in current categories, railroad car building and shipyards, a better supply of structurals is definitely ahead.

Philadelphia—Structural activity is lagging with fabricators competing sharply for government approved work. Most shops have enough such business to keep active for the next few months, but not a sufficient amount to keep going well into second half.

Pittsburgh — District mills see structurals rapidly coming into supply-demand balance unless new building programs are instituted. On the other hand some fabricators claim they can't get enough of the desired shapes to complete business on their books.

Seattle—Fabricators are whittling backlogs steadily. They are seeking new business but material shortages are restricting bidding in some directions.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 175

Pittsburgh — Steel producers who have been concerned over the supply of metallurgical coal have taken the entire output of two mines. All production from the Renton No. 6 mine at Newfield, Pa. will go to Republic Steel Corp. and output from Renton No. 3 mine will be taken by National Steel Corp. Both properties are in the Freeport Field area northeast of Pittsburgh. Pittsburgh Consolidation Coal Co. was a principal in both deals. The two mines produce approximately 2000 and 3500 tons daily, respectively.

Tubular Goods . . .

Tubular Goods Prices, Page 175

Cleveland—Tight supply conditions in tubular goods were intensified by labor trouble at Youngstown Sheet & Tube Co.'s seamless mill last week. While only a few days operating time was lost, this added lost production further delays the company in catching up with back shipments. Pressure for oil country pipe continues just as strong as ever and there is little sign of early relief in the situation.

Boston—Smaller sizes of merchant steel pipe are easing in supply. Galvanized also is loosening up for second quarter, as early as March with one or two producers. Seamless and

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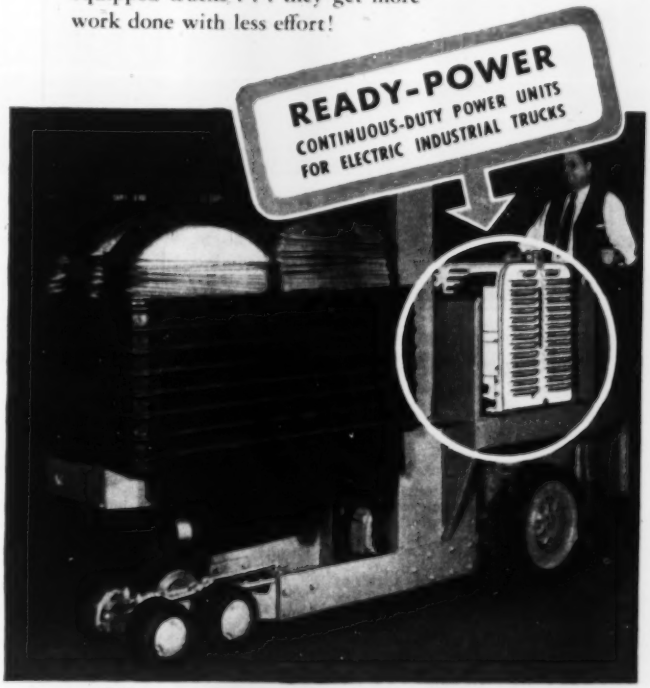

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tubing specialties supplies are still limited being sold out through second quarter. Some schedules have limited openings on buttweld for the period. Instributors are taking full allotments for April, but shipment pressure is off.

Los Angeles—Inquiries have slackened for small diameter pipe and seamless tubing. Continental Oil Co. and Sinclair Oil Corp., will construct an 8-in. 310 mile long pipeline from Sinclair, Wyo. to Salt Lake City, Utah, at a cost of $8 million.

Pig Iron . . .

Pig Iron Prices, Page 170

Cleveland—Further easing in pressure for merchant pig iron is in evidence in this general consuming area. For some months past the light gray iron foundries have been operating on the sluggish side. They have not been taking in pig iron in the same volume as formerly. Now, the malleable foundries appear to be slackening, reflecting slowing down in automotive requirements. While there is no surplus of iron in this area more foundries are carrying inventories up to the legal limit. Further, where merchant sellers formerly had been shipping 30-ton lots, now buyers have less difficulty getting 50-ton carlots.

Buffalo—Firmer tendencies are reported again in the merchant pig iron market as the tonnage going into steel production increases. It is estimated approximately 75 to 80 per cent of current output is going to the steelmaking furnaces. As a result, merchant sellers anticipate possible difficulty in meeting future bookings. Michigan automotive castings shops are still active buyers of iron here.

Philadelphia—Some small scattered lots of Spanish iron were purchased by district foundries recently. Shipments are scheduled to leave the other side before end of March, subject to vessel arrangements. The iron is reported coming in at around $70, delivered. In general little foreign iron is being purchased at this time. Little is being offered. Holland, a leading foreign supplier normally, is offering nothing although some shipments are still being received against orders placed many months ago in at least one important instance. Germany has little to sell here and, likewise, France.

Boston—Consumers of foundry grades are well supplied but the contrary is true of basic iron users partly dependent on foreign supplies. Demand on machine tool account is slightly stronger. One large textile mill equipment shop has a machine tool contract. Also, the United Shoe Machinery Corp., Beverly, Mass., is building milling machines, pool orders through Kearney & Trecker, Milwaukee.

New York—Most district gray iron foundries can handle at least 30 per cent more business than they are getting without putting on extra shifts. The slack, however, is not reflected in demand for pig iron to much extent as most foundries are taking in iron in order to sweeten their mix.

Pittsburgh—Demand for merchant iron, which fell off recently due to cutbacks in consumer casting business, remains static. Many foundries are using cast scrap which is plentiful in this area. All blast furnaces are producing with the exception of one at U. S. Steel's Duquesne Works which is out for repairs.

Lone Star, Tex.—Blast furnace of the Lone Star Steel Co. has been restored to blast after a month's shutdown for repairs, including relining.

Rails, Cars . . .

Track Material Prices, Page 173

New York—Domestic freight car awards of 5338 units in January showed an increase of 2029 over the preceding month, according to the American Railway Car Institute and the Association of American Railroads. The order backlog, as of Feb. 1, was 120,251 cars. January deliveries totaled 8642 units, a slight increase from the 8458 in December and a gain of 2500 above the January, 1951, total.

Pittsburgh—Because of cutbacks in the railroad car building program operations at spring and other car parts suppliers are being adversely affected due to deferment of orders by the carbuilders.

Scrap . . .

Scrap Prices, Page 178

Pittsburgh — Overall picture remains static in this area. The largest consumer reports stocks are still at a four-day level. All open hearths are operating with exception of four down for repairs. Some dealers report better receipts; others say incoming shipments are only average. Some shading in price of cast is reported but dealers advise it is not enough to make a market. As far as the market goes the OPS ceiling prevails. Foundries are keeping the area cast market going as their purchases have been good to date. Brokers think prices may ease during the next two or three months if the government does not come through with more defense business. Stocks of electric furnace operators are the best of any in the area.

New York—City officials estimate 10,000 tons of street car rail are no longer in use in Manhattan alone, but that it would cost close to $115 per ton to reclaim the steel and restore the streets to usable condition. This cost compares with a going market of around $42 per ton. While OPS allows consumers to pay a premium for such material as it comes under the heading of demolition scrap, the differential in this case appears too great to attract buying interest.

Some attention also is being focused on the scrap that could be obtained by wrecking the Third Avenue elevated line. It appears, however, that this line could not be scrapped until the Second Avenue subway line is completed to relieve the traffic. As finished steel is restricted for this latter project there is little probability it will be completed for some time.

Boston—Shipments of steel scrap equal yard take, but the latter could use more light metal for processing. Open hearth consumers have asked for allocations on higher quality grades than normally obtained in ordinary heavy melting shipments. Coupled with slow demand for found-

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ry cast is up-grading. With ample supply of pig iron and cast to specification, casting rejects are ower.

Philadelphia—Exceptionally good weather is contributing greatly to the fact district mills have had to curtail production little because of lack of steel scrap. Winter still has more than a month to go, but the major portion of the season is over. While open-hearth grades are still under allocation and supplies of steel scrap are short, there does not appear to be quite the stringency of a few weeks ago. As for cast scrap, supply still remains easy.

Cleveland—Mills in this district still have less than one week's supply of scrap and are anxious to replenish inventories. The supply situation is critical, since any interruption to the steady flow of material would threaten operations at most mills. Dealers report a sharp drop in collection of industrial material in this district and some yards have laid off workers. Cast iron grades are offered freely and some shipments from remote points are offered at concessions on freight charges. Offerings of unstripped motor blocks are particularly heavy. Consensus in the trade here is that the curtailment in foundry melt is temporary and that a pick-up may develop soon.

Buffalo—New allocation orders for scrap have been placed here for shipment to leading mill consumers. A better feeling prevails in the market generally. More scrap is coming out and the threat to sustained ingot production is subsiding. The cast market remains easy but dealers report no sales below ceiling price levels.

Detroit—Better supply and improved quality scrap are reported by local mills. Inventories are uneven but pressure has eased off in the market at least temporarily. Foundries are able to get as much pig iron as they want and there is no tendency to take anything less than the most desirable grades of clean scrap.

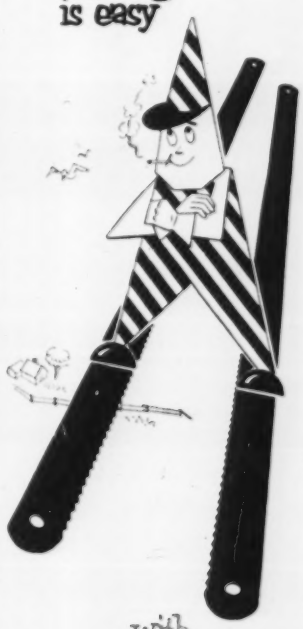
Youngstown—District steel mills are encouraging a farm scrap drive being planned by the Chamber of Commerce scrap committee. Dealers are being urged to canvass farms in this general area offering to purchase scrap at prevailing prices.

Cincinnati—More scrap is coming out and the mills are able to build moderate stocks. Easier supply condition is reflected in turndowns of material carrying high freight charges. Softness in cast continues.

Chicago—Prolonged mild weather in the Midwest is permitting scrap dealers to maintain operations at better than normal seasonal pace and shipments from this source are providing mills with enough material to maintain high-level steelmaking. Inventory building isn't possible. However, the general outlook is more favorable.

St. Louis—Moderate weather and better auto graveyard tonnage have stimulated the scrap movement. Considerable No. 2 scrap and body stock bundles are hitting the market as auto wreckers clear out old cars against the M-92 Mar. 1 deadline. Mill scrap inventories are approaching a fairly comfortable three to four weeks. Some distress cast grades have taken the anticipated below-ceiling drop, the device being refusal of buyers to absorb freight. Net effect

anything is easy



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Los Angeles—Buying of cupola cast scrap by foundries remains depressed.

San Francisco — Steelmakers continue uneasy over the scrap shortage and the threat it presents to maintenance of the current high operating rate. Some hope for relief is seen in scrap from the Korean battlefields.

Seattle—Cast iron scrap is easier to obtain and is moving $5 per ton under the ceiling price. This is attributed to slower demand from the foundries and larger production from auto graveyards.

Warehouse . . .

Warehouse Prices, Page 177

Philadelphia—While there is some building up of inventories, distributors are selling most major items about as fast as they are being received from the mills. Carbon bars, and particularly cold drawn bars, are in very tight supply. Shapes, 10-in. and under are another stringent product, with no indications of early easing. Thick plates are scarce, although some easing is noted in thicknesses under ½-in.

Pittsburgh—Distributors report sales are holding up well despite definite lessening of demand pressure. Easing in the lighter gage sheets is noted by all. But bars, plates and structural shapes continue in strong demand. Warehouses report one big problem is unbalance size-wise in inventories. Improvement is hoped for during third quarter when most operators think better mill receipts will be forthcoming.

Cleveland — Warehouse receipts from the mills are improved as compared with some time back but stocks continue unbalanced. The situation is especially difficult with respect to large size bars. The light, flat-rolled items are much more readily available and so are light gage plates.

Chicago — Warehouse stocks of some products are improving but they still have a long way to go to reach levels deemed desirable for good customer accommodation. On the improved side are tin mill products, wire products, tubular goods, small bars and light structurals and cold-rolled sheets and strip.

Seattle—Warehouses claim allocations to them are insufficient to meet current demands. Structurals are hard to obtain from eastern mills, particularly wide flange beams 15-in. and up, and channels 12-in. and up.

Canada . . .

Toronto, Ont.—Production of primary iron and steel shapes in Canada in November amounted to 421,911 net tons compared with 410,348 tons in October and 390,988 tons in November, 1950.

Shipments for sale amounted to 282,934 net tons and included 269,667 tons of carbon and 13,267 tons of alloy steel shapes. For October shipments amounted to 269,539 tons including 256,999 tons of carbon and 12,540 tons of alloy steel shapes, and for November, 1950, 255,644 net tons including 242,357 tons of carbon and 12,287 tons of alloy steel shapes.

Of November shipments 56,159 tons went to railway and railway car shops; 16,851 to pressing, forming and stamping plants; 34,921 to merchant trade products; 31,555 to building construction; 21,651 to the container industry; 15,552 to agricultural equipment; 20,136 to the automotive industry; 17,253 to machinery plants; 4309 to shipbuilding; 12,143 to mining, lumbering, etc., and 9936 to miscellaneous industries. Wholesalers and warehousing accounted for 32,221 and exports for 10,247 tons.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

520 tons, high school, Bucks county, Pennsylvania, to Luria Engineering Co., New York.

120 tons, two state bridges, Shawsheen river, Billerica-Bedford-Burlington highway section, Massachusetts, to Grouser & Shlager Iron Works, Somerville, Mass.; Peter Salvucci, Waltham, Mass., general contractor.

100 tons or more, vocational school, Waterbury, Conn., to Fort Chester Iron Works, Port Chester, N. Y., and Scherer Steel Co., Hartford, Conn.; Wadhams & May Co., Hartford, general contractor.

STRUCTURAL STEEL PENDING

4000 tons, transmission towers; bids to Bonneville Power Administration, Portland, Oreg., Feb. 20.

2000 tons, bridge superstructure, South bridge, Agawam-Springfield, Mass.; bids in on substructure, Savin Construction Corp., East Hartford, Conn., low, $939,702.50.

2000 tons, Boeing hangar, Seattle; bids in Feb. 12.

250 tons, skew span bridge, Wilbur Cross parkway, Vernon, Conn.; Brunalli Construction Co., Southington, Conn., low, $137,883.35.

REINFORCING BARS . . .

REINFORCING BARS PENDING

300 tons, Elmendorf air field barracks, Alaska; Valle-Sommers Co., Seattle, low, $2,128,000.

200 tons, (also 50 tons shapes) Saddle Gap pumping plants and other Columbia Basin projects; Intermountain Plumbing Co., Boise, Idaho, and Henry L. Horn, Ephrata, Wash., joint, low, $854,026.

125 tons, three warehouses, North Richland, Wash.; general contract to Sound Construction & Engineering Co., Seattle.

Unstated, Oregon state Hood river overcrossing; general contract to C. M. Halvorsen, Portland, low, $196,630.

Unstated, Oregon state overcrossing, Wasco county; general contract to Lockyear & White Inc., Longview, Wash.

Unstated, Washington state girder bridge, Mason county; David Nygren, Seattle, low.

PLATES . . .

PLATES PENDING

Unstated, fuel tanks and facilities, McCord air field, Washington state; general contract to Burrows & Milone, Tacoma, low, $409,565.

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PORT HOPE, ONTARIO, CANADA

Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Smith & Mills Co. Purchased

Executive, sales and engineering offices of Smith & Mills Co., manufacturer of shapers, were established at 400 W. Madison St., Chicago. The Smith & Mills business was acquired from Hamilton-Thomas Corp. by interests represented by A. G. Bryant who becomes president of Smith & Mills Co. Mr. Bryant also is president of Bryant Machinery & Engineering Co. and vice president of Cleereman Machine Tool Co. George H. Merriell becomes Smith & Mills' vice president and general manager.

Superdraulic Buys Fabricator

Superdraulic Corp., Detroit, purchased Steel Fabricating & Sheet Metal Co., Dearborn, Mich. The acquired firm will become a division of Superdraulic and will continue operation under James McKay, general manager.

To Make Aircraft Equipment

Canadian Flight Equipment Ltd. was established at Cobourg, Ont., and will manufacture aircraft equipment at a new plant. Officers of the firm are: President, R. A. J. Murison; vice president, John A. D. Craig. The firm has acquired all North American manufacturing rights of the products of the Martin-Baker Aircraft Co. Ltd.

Diecraft Enlarges Plant

Diecraft Inc., precision metal fabricator, Baltimore, is increasing its manufacturing space by the addition of structure containing 6750 square feet. Harry A. Dundore is owner.

California Plater Expands

Superior Chrome Plating Co., Compton, Calif., is constructing additional shop space for metal plating at 239 E. Greenleaf St., that city.

Motorola Division Moved

Motorola Inc., Chicago, moved its Communications & Electronics Division to 4501 W. Augusta Blvd., that city. The $1,250,000 building provides 200,000 square feet of plant and office space.

Subcontracting Work Spread

Mare Island shipyard's farm-out program has enlisted the aid of about 119 small business firms in northern and central California, including 59 machine shops, 15 foundries, 8 electrical repair shops, 7 sheet-metal shops, 5 steel fabricators and 4 spring manufacturers. During the ten months ended Dec. 31 there were 449 contracts, totaling $2,242,908, awarded to augment facilities at the Navy yard.

Metalworking Plant Started

Manufacturers' Representatives Inc., Chicago, is building a $200,000 plant at 53rd street and Knox avenue, that city. The firm, which succeeded the partnership of Alvin A. and Mary Schultz, will be engaged principally in the manufacture of nails. The plant also will have facilities for galvanizing sheet steel and fabricating wire products.

Tool & Die Firm Expands

Buffalo Tool & Die Mfg. Co., Buffalo, is erecting a plant addition which will add 10,000 square feet of floor space and result in a considerable increase in production. The company was formed during World War II and purchased its present plant in 1946.

Coupling Firm Names Agent

U. & S. Inc., Syracuse, N. Y., was appointed sales representative for central and eastern New York state by American Flexible Coupling Co., Erie, Pa.

Koppers Acquires Plant

Koppers Co. Inc., Metal Products Division, Baltimore, acquired the former plant of K. Hettleman & Sons Inc., 1400 Bush St., which adjoins the Koppers' plant. The new plant comprises 45,000 square feet of building space, which will be used to augment the company's machine shop facilities. Equipment is now being installed.

Machine Shop Opens

Richmond shipyard No. 4 on San Francisco Bay, idle since 1945, will be reactivated for machine shop work by Moore Industrial Co. under a lease signed with the U. S. Maritime Commission, owner of the property. The $29 million yard was engaged in shipbuilding work during World War II. First plans call for overhauling machinery in one $3 million shop and rehabilitation there of tools from other western defense plants as well as production on defense contracts. Signing of the lease by Moore halted a program of dismantling

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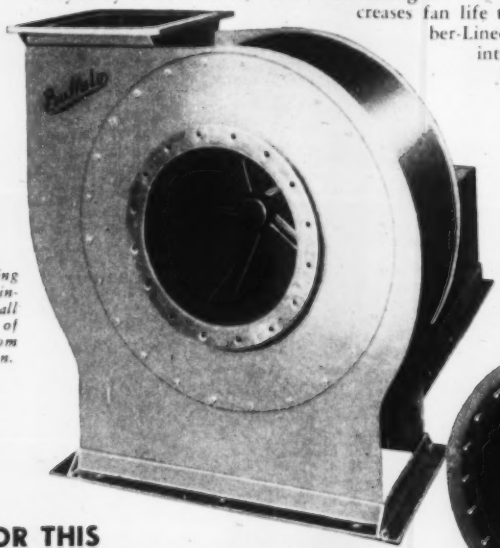
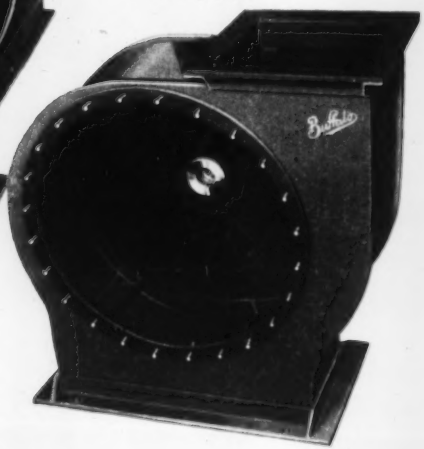
Above, showing how rubber lining protects all steel parts of the fan from fume corrosion.





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the shops and distributing the machine tools to defense plants in other parts of the country.

Utility Plans Big Expansion

Pacific Telephone and Telegraph Co., Los Angeles, will spend $200 million in new plants and equipment during 1952, says Mark R. Sullivan, president. Peak postwar expansion year for the company was 1948 with $248 million.

Monsanto Plans Phenol Plant

Monsanto Chemical Co. will begin construction at midyear of a phenol plant in Avon, Contra Costa county, near San Francisco. Production is expected in the early part of 1954.

Reichhold Builds in South

Reichhold Chemicals Inc., Detroit, will start soon a $1,475,000 expansion program at Tuscaloosa, Ala. A. J. Ryan, vice president of the company's southern division, says a major product at that plant is phenol.

Nesbitt Co. Buys Plant

John J. Nesbitt Co., manufacturer of heating, ventilating and air conditioning equipment, purchased a plant at 7930 State Rd., Philadelphia. The plant contains about 82,000 square feet of manufacturing space and will be used to expand the firm's present facilities which adjoin the property.

Ingalls To Build Two Oilers

Ingalls Shipbuilding Corp., Birmingham, will build two large new type fleet oilers for the Navy at a cost of $20,153,974 at its Pascagoula, Miss., plant. The contract price does not include an additional $8 million for material procured by the government and which will go into the ships.

Ellfeldt Observes 50th Year

Ellfeldt Machinery & Supply, Kansas City, Mo., opened an office at 312 Laura St., Wichita, Kans. Ellfeldt distributes carboloy standard cutting tools and tool tips, masonry drills and carbide wheel dressers. The company is observing its 50th anniversary this year.

Hewitt-Robins Inc. Moves

Hewitt-Robins Inc. will move its headquarters offices from New York to Stamford, Conn., about Apr. 1. The company produces belt conveyor systems, vibrating machinery, industrial hose and foam rubber products. Eastern division and export sales offices of Hewitt Rubber, Restfoam and Robins Conveyors divisions will remain at 370 Lexington Ave., New York; offices of Robins Engineers Division will continue at 157 Chambers St., New York.

MICAMAT: By treating minute flakes of mica so that a generated force holds them together, General Electric Co. has produced domestic mica in a continuous sheet shown coming from the machine above. New laminates, tapes and molded shapes may be made from this new form of electrical insulating material

Crown Opens Machine Shop

Crown Metal Products Inc., Baltimore, began operation of a machine shop in 20,000 square feet at 1727 Llewellyn Ave. In addition to general machine shop work, the company will specialize in the manufacture of tools, jigs and dies.

Revere Expansion Progresses

Revere Copper & Brass Inc. expects to complete a 60,000 square foot addition to its Wicomico plant in Baltimore within the next three to four months. This particular plant is engaged in aluminum tube and extrusion work, with the new addition doubling its present capacity.

Zurn Appoints Sales Agent

Zurn Services Inc., Erie, Pa., appointed John B. Foley Co., as sales representative for its fluid handling equipment.

Diez & Hynson Builds Plant

Diez & Hynson, 440 North Front Street, Baltimore, nonferrous castings and machine shop work, is erecting a plant at 2800 Boston Street, into which it plans to move early this spring. The building will be one-story, 33 by 72 feet. Carl C. Diez is owner.

Grotnes Expanding Facilities

Charles Grotnes Machine Works Inc., Chicago, is erecting a building at 5454 Wolcott Ave., that city. It will house machine shop and

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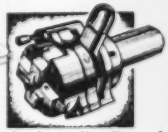

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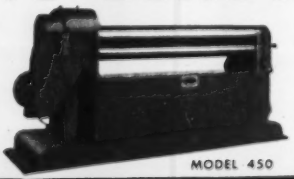

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assembly area, locker rooms, general and executive offices. The firm has drawn tentative plans for factory expansion.

Trailmobile Canada Expands

Trailmobile production facilities in Canada were trebled by construction in Scarborough, Ont., of a manufacturing plant for Trailmobile Canada Ltd., a subsidiary of Trailmobile Inc., Cincinnati. The new factory is additional to manufacturing facilities which have been operated by Trailmobile in Windsor, Ont., for the last six years.

Helicopter Firm Builds Plant

American Helicopter Co., Manhattan Beach, Calif., has completed construction of a 15,000 square foot plant housing the general offices and enginering department alongside its present plant.

Kurt Orban Moves Offices

Kurt Orban Co. Inc. moved its executive offices to 205 E. 42nd St., New York 17. The company imports steel, machine tools, nonferrous metals, and industrial equipment.

Lear Expands on West Coast

Lear Inc., Grand Rapids, Mich., electronics manufacturer, is increasing production facilities at its Los Angeles plant by constructing a 70,000 square foot building at the Santa Monica airport.

Parker Appoints Distributor

Aero Bolt & Screw Co., Inglewood, Calif., was appointed distributor for O-ring seals manufactured by Parker Appliance Co., Cleveland. Aero Bolt will carry stocks of O-rings in a broad size range at its warehouse, 1701 Arbor Vitae Ave.

Rheem Leases Storage Space

Rheem Mfg. Co., Sparrows Point, Md., automatic water heaters, tanks, steel barrels, etc., has leased for storage, 30,000 square feet in one of the buildings of the idle Pittsburgh Mill Steel Co. Inc., 4500 East Lombard St.

Martin Expands Plane Plant

Glenn L. Martin Co., Middle River, Md., plans to build a $5 million addition to its No. 2 Army plant. The new space will be used for storage, thus permitting the entire present structure to be used for the manufacture of English-designed two-engined jet bomber "Canberra."

Ohio Equipment Gets Agency

Ohio Equipment Co. Inc., Cleveland, was appointed sales representative by Evolvator Co., North Bergen, N. J., manufacturer of elevators, tiering machinery, lift trucks, storage racks, floor trucks, etc.

Duffy Heads New Department

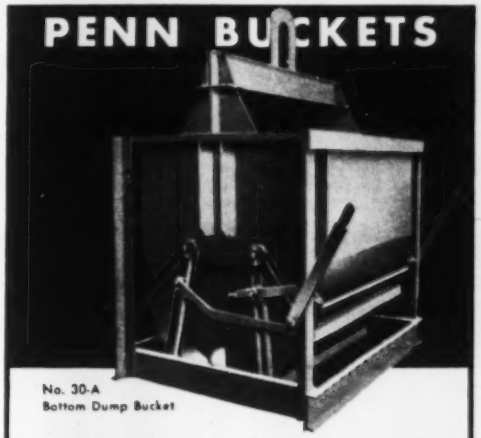
Pennsylvania Salt Mfg. Co., Philadelphia, consolidated all sales and service in chemical specialties for metal cleaning, fabricating and processing in one sales department. Sales manager of the metal processing department is J. J. Duffy Jr.

Distributorship Awarded

Industrial Washing Machine Corp., New Brunswick, N. J., appointed Industrial Systems Co., that city, as exclusive distributor for its line of washing and metal treating machines. Industrial Systems also acts as exclusive distributor of its own conveyors.

GRAPHITE GOUGINGS: The earth is being gouged out for the foundation of the new graphitizing facilities at the Niagara Falls plant of International Graphite & Electrode Corp., a subsidiary of Speer Carbon Co., St. Marys, Pa. Covering 25 acres at a cost of $10 million the plant will include a calciner, 16 furnaces and milling extruding and baking facilities. It will be completed in May, 1953.

PENN BUCKETS



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1—1300 Ton Moving Down 4 Column Type 92" R to L x 92" F to B—72" Daylight—48" Stroke 14'2" Overall length of Platens R to L.

1—1500 Ton Moving Down 4 Column Type 84" R to L x 68" F to B—46" Daylight—18" Stroke 16'0" Overall Length of Platens R to L.

1—1500 ton Plate Straightening Press—Gantry Type. For Plates up to 8" thick x 100" wide. Opening 120" R to L—Traverse of Pressing Ram 44" each side of center R to L by motor drive—Chain drive for feeding plates into and out of Press. Complete with Oil Pump unit—New Equipment.

1—2000 Ton Moving Down 4 Column Type 110" R to L x 28" F to B—28" Daylight—28" Stroke. Complete with Oil Pump unit.

1—3300 Ton Stamping or Forging Press with Pumps, Accum. Crane, etc.—New Equipment.

1—800 Ton Baldwin Side Housing Hyspeed Type 52" R to L x 42" F to B—56" Daylight—20" Stroke. Complete with Oil Pump unit and 75 HP Motor.

1—1000 Ton Baldwin Side Housing Hyspeed Type 54" R to L x 44" F to B—58" Daylight—20" Stroke. Complete with Oil Pump Unit and 125 HP Motor.

2—325 GPM Aldrich Vertical Triplex Pumps—1500 PSI Water Service.

2—450 GPM Baldwin Horiz. Triplex Pumps—1500 PSI Water Service.

1—Accumulator weighted type—9⅝" dia. x 10'0" Stroke—4000 PSI—58 gal. cap.

1—350 Ton Farquhar Gap Press—54" Throat—69" Daylight—36" Stroke with Oil Pump Unit.

1—400 Ton Baldwin Gap Press—56" Throat —50" Daylight—30" Stroke with Oil Pump Unit.

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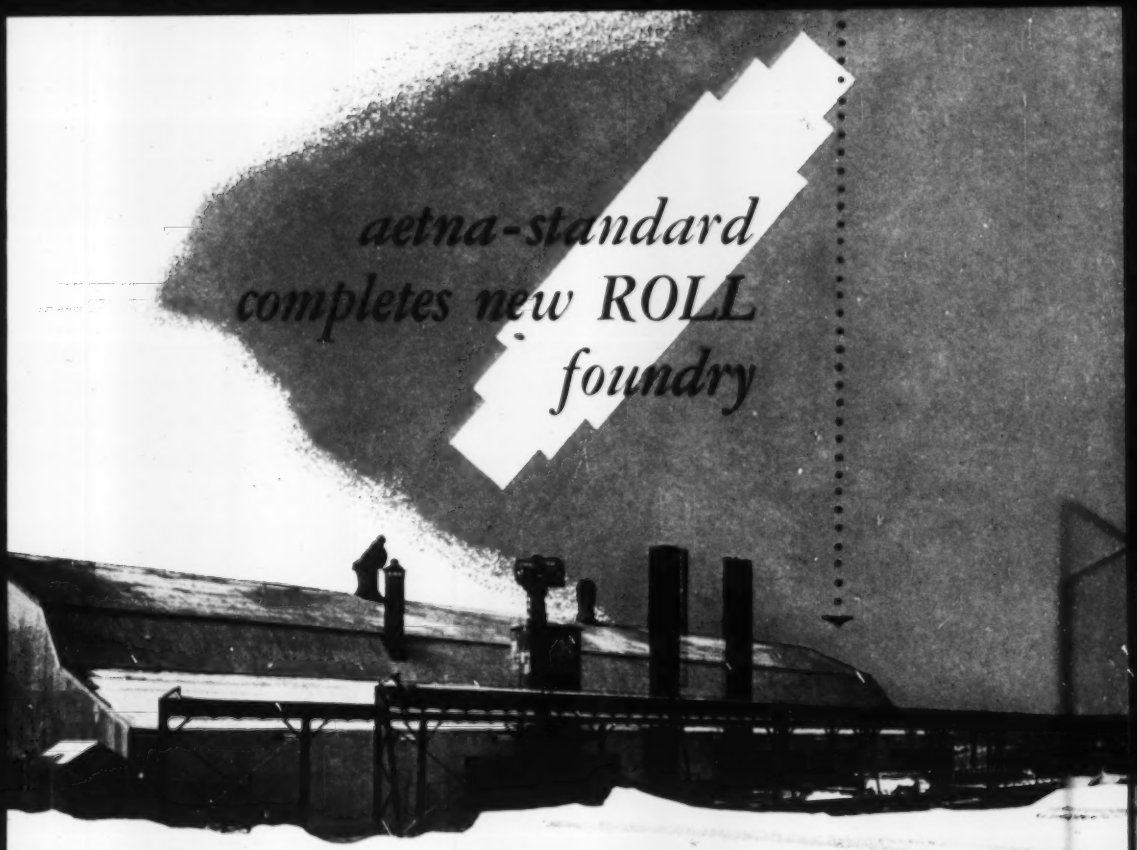

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